

Đã bắt đầu vào lúc	Thứ tư, 12 Tháng mười 2022, 10:58 PM
Tình trạng	Đã hoàn thành
Hoàn thành vào lúc	Thứ tư, 12 Tháng mười 2022, 11:01 PM
Thời gian thực hiện	2 phút 57 giây
Điểm	11,00/11,00
Điểm	10,00 của 10,00 (100%)



Câu hỏi 1

Chính xác

Điểm 1,00 của 1,00

Implement methods **add**, **size** in template class **SLinkedList** (which implements **List ADT**) representing the singly linked list with type **T** with the initialized frame. The description of each method is given in the code.

```
template <class T>
class SLinkedList {
public:
    class Node; // Forward declaration
protected:
    Node* head;
    Node* tail;
    int count;
public:
    SLinkedList();
    ~SLinkedList();
    void    add(T e);
    void    add(int index, T e);
    int     size();
public:
    class Node {
    private:
        T data;
        Node* next;
        friend class SLinkedList<T>;
    public:
        Node() {
            next = 0;
        }
        Node(Node* next) {
            this->next = next;
        }
        Node(T data, Node* next) {
            this->data = data;
            this->next = next;
        }
    };
};
```



For example:

Test	Result
<pre>SLinkedList<int> list; int size = 10; for(int index = 0; index < size; index++){ list.add(index); } cout << list.toString();</pre>	[0,1,2,3,4,5,6,7,8,9]
<pre>SLinkedList<int> list; int size = 10; for(int index = 0; index < size; index++){ list.add(0, index); } cout << list.toString();</pre>	[9,8,7,6,5,4,3,2,1,0]

Answer: (penalty regime: 0, 0, 0, 5, 10, 15, ... %)

Reset answer

```
1 template <class T>
2 void SLinkedList<T>::add(const T& e) {
3     /* Insert an element into the end of the list. */
4     Node* newNode = new Node(e, nullptr);
5     if(count == 0){
6         head = tail = newNode;
7         count++;
8         return;
9     }
10    tail->next = newNode;
11    tail = newNode;
12    count++;
13 }
14
15 template<class T>
16 void SLinkedList<T>::add(int index, const T& e) {
17     /* Insert an element into the list at given index. */
18     Node* newNode = new Node(e, nullptr);
19     if(count == 0){
20         head = tail = newNode;
21         count++;
22         return;
23     }
24     Node* tmp = head;
25     if(index == 0){
26         newNode->next = head;
27         head = newNode;
28         count++;
29         return;
30     }
31     if(index == count){
32         tail->next = newNode;
33         tail = newNode;
34         count++;
35         return;
36     }
37     for(int i = 1; i < index; i++) tmp = tmp->next;
38     newNode->next = tmp->next;
39     tmp->next = newNode;
40     count++;
41 }
42
43 template<class T>
44 int SLinkedList<T>::size() {
45     /* Return the length (size) of list */
46     return count;
47 }
48
```



	Test	Expected	Got	
✓	<pre> SLinkedList<int> list; int size = 10; for(int index = 0; index < size; index++){ list.add(index); } cout << list.toString(); </pre>	[0,1,2,3,4,5,6,7,8,9]	[0,1,2,3,4,5,6,7,8,9]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.



Câu hỏi 2

Chính xác

Điểm 1,00 của 1,00

Implement methods **get**, **set**, **empty**, **indexOf**, **contains** in template class **SLinkedList** (which implements **List ADT**) representing the singly linked list with type **T** with the initialized frame. The description of each method is given in the code.

```
template <class T>
class SLinkedList {
public:
    class Node; // Forward declaration
protected:
    Node* head;
    Node* tail;
    int count;
public:
    SLinkedList(): head(NULL), tail(NULL), count(0);
    ~SLinkedList() { };
    void    add(T e);
    void    add(int index, T e);
    int     size();
    bool    empty();
    T       get(int index);
    void    set(int index, T e);
    int     indexOf(T item);
    bool    contains(T item);
public:
    class Node {
    private:
        T data;
        Node* next;
        friend class SLinkedList<T>;
    public:
        Node() {
            next = 0;
        }
        Node(Node* next) {
            this->next = next;
        }
        Node(T data, Node* next = NULL) {
            this->data = data;
            this->next = next;
        }
    };
};
```

For example:



Test	Result
<pre> SLinkedList<int> list; int values[] = {10, 15, 2, 6, 4, 7, 40, 8}; int index[] = {0, 0, 1, 3, 2, 3, 5, 0}; int expvalues[] = {8, 15, 2, 4, 7, 10, 40, 6}; for (int idx = 0; idx < 8; idx++){ list.add(index[idx], values[idx]); } assert(list.size() == 8); for (int idx = 0; idx < 8; idx++){ assert(list.get(idx) == expvalues[idx]); } cout << list.toString(); </pre>	[8,15,2,4,7,10,40,6]
<pre> SLinkedList<int> list; assert(list.empty() == true); cout << list.toString(); </pre>	[]

Answer: (penalty regime: 0, 0, 0, 5, 10, 15, ... %)

Reset answer

```

1  template<class T>
2  T SLinkedList<T>::get(int index) {
3      if(index >= count || index < 0) throw std::out_of_range("hi");
4      /* Give the data of the element at given index in the list. */
5      Node* tmp = head;
6      for(int i=1; i<= index;i++) tmp = tmp->next;
7      return tmp->data;
8  }
9  }
10
11 template <class T>
12 void SLinkedList<T>::set(int index, const T& e) {
13     /* Assign new value for element at given index in the list */
14     if(index >= count || index < 0) throw std::out_of_range("hi");
15     Node* tmp = head;
16     for(int i = 1; i<=index;i++) tmp = tmp->next;
17     tmp->data = e;
18 }
19
20 template<class T>
21 bool SLinkedList<T>::empty() {
22     /* Check if the list is empty or not. */
23     if(count) return false;
24     return true;
25 }
26
27 template<class T>
28 int SLinkedList<T>::indexOf(const T& item) {
29     /* Return the first index wheter item appears in list, otherwise return -1 */
30     Node* tmp = head;
31     int index = 0;
32     while(tmp != nullptr){
33         if(tmp->data == item) return index;
34         tmp = tmp->next;
35         index++;
36     }
37     return -1;
38 }
39
40 template<class T>
41 bool SLinkedList<T>::contains(const T& item) {
42     /* Check if item appears in the list */

```

```

43 |     Node* tmp = head;
44 |     while(tmp != nullptr){
45 |         if(tmp->data == item) return true;
46 |         tmp = tmp->next;
47 |     }
48 |     return false;
49 | }

```

	Test	Expected	Got	
✓	<pre> SLinkedList<int> list; int values[] = {10, 15, 2, 6, 4, 7, 40, 8}; int index[] = {0, 0, 1, 3, 2, 3, 5, 0}; int expvalues[] = {8, 15, 2, 4, 7, 10, 40, 6}; for (int idx = 0; idx < 8; idx++){ list.add(index[idx], values[idx]); } assert(list.size() == 8); for (int idx = 0; idx < 8; idx++){ assert(list.get(idx) == expvalues[idx]); } cout << list.toString(); </pre>	[8,15,2,4,7,10,40,6]	[8,15,2,4,7,10,40,6]	✓
✓	<pre> SLinkedList<int> list; assert(list.empty() == true); cout << list.toString(); </pre>	[]	[]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 3

Chính xác

Điểm 1,00 của 1,00

Implement methods **removeAt**, **removeItem**, **clear** in template class **SLinkedList** (which implements **List ADT**) representing the singly linked list with type **T** with the initialized frame. The description of each method is given in the code.

```
template <class T>
class SLinkedList {
public:
    class Node; // Forward declaration
protected:
    Node* head;
    Node* tail;
    int count;
public:
    SLinkedList();
    ~SLinkedList();
    void add(T e);
    void add(int index, T e);
    int size();
    bool empty();
    int size();
    void clear();
    T get(int index);
    void set(int index, T e);
    int indexOf(T item);
    bool contains(T item);
    T removeAt(int index);
    bool removeItem(T item);
public:
    class Node {
    private:
        T data;
        Node* next;
        friend class SLinkedList<T>;
    public:
        Node() {
            next = 0;
        }
        Node(Node* next) {
            this->next = next;
        }
        Node(T data, Node* next = NULL) {
            this->data = data;
            this->next = next;
        }
    };
};
```



For example:

Test	Result
<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(0) == list.removeAt(0)); cout << list.toString();</pre>	[1,2,3,4,5,6,7,8,9]

Test	Result
<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(9) == list.removeAt(9)); cout << list.toString();</pre>	[0,1,2,3,4,5,6,7,8]
<pre>SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.removeItem(9)); cout << list.toString();</pre>	[0,1,2,3,4,5,6,7,8]

Answer: (penalty regime: 0, 0, 0, 5, 10, 15, ... %)

Reset answer

```
1 template <class T>
2 T SLinkedList<T>::removeAt(int index)
3 {
4     /* Remove element at index and return removed value */
5     if(index >= count || index < 0) throw std::out_of_range("hi");
6     if(count == 1){
7         T value = head->data;
8         delete head;
9         head = tail = nullptr;
10        count--;
11        return value;
12    }
13    if(index == 0){
14        Node* tmp = head;
15        T value = head->data;
16        head = head->next;
17        delete tmp;
18        count--;
19        return value;
20    }
21    Node* tmp = head;
22    for(int i = 1; i < index; i++) tmp = tmp->next;
23    if(index == count - 1) tail = tmp;
24    Node* tmp2 = tmp->next;
25    T value = tmp->next->data;
26    tmp->next = tmp->next->next;
27    delete tmp2;
28    count--;
29    return value;
30 }
31
32 template <class T>
33 bool SLinkedList<T>::removeItem(const T& item)
34 {
35     /* Remove the first apperance of item in list and return true, otherwise return false */
36     Node* tmp = head;
37     int i = 0;
38     while(tmp != nullptr){
39         if(tmp->data == item) {
40             removeAt(i);
41             return true;
42         }
43         tmp = tmp->next;
44         i++;
45     }
46     return false;
47 }
```

```

48
49 template<class T>
50 void SLinkedList<T>::clear(){
51     /* Remove all elements in list */
52     while(count){
53         removeAt(0);
54     }
55 }
56
57

```

	Test	Expected	Got	
✓	<pre> SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(0) == list.removeAt(0)); cout << list.toString(); </pre>	[1,2,3,4,5,6,7,8,9]	[1,2,3,4,5,6,7,8,9]	✓
✓	<pre> SLinkedList<int> list; for (int i = 0; i < 10; ++i) { list.add(i); } assert(list.get(9) == list.removeAt(9)); cout << list.toString(); </pre>	[0,1,2,3,4,5,6,7,8]	[0,1,2,3,4,5,6,7,8]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

TÀI LIỆU SƯU TẬP
BỞI HCMUT-CNCP

Câu hỏi 4

Chính xác

Điểm 1,00 của 1,00

Implement Iterator class in class SLinkedList.

Note: Iterator is a concept of repetitive elements on sequence structures. Iterator is implemented in class vector, list in STL container in C++ (<https://www.geeksforgeeks.org/iterators-c-stl/>). Your task is to implement the simple same class with iterator in C++ STL container.

Please read example and testcase carefully.



```

template <class T>
class SLinkedList
{
public:
    class Iterator; //forward declaration
    class Node;     //forward declaration
protected:
    Node *head;
    Node *tail;
    int count;
public:
    SLinkedList() : head(NULL), tail(NULL), count(0){};
    ~SLinkedList();
    void add(const T &e);
    void add(int index, const T &e);
    T removeAt(int index);
    bool removeItem(const T &removeItem);
    bool empty();
    int size();
    void clear();
    T get(int index);
    void set(int index, const T &e);
    int indexOf(const T &item);
    bool contains(const T &item);
    string toString();
    SLinkedList(const SLinkedList &list)
    {
        this->count = 0;
        this->head = NULL;
        this->tail = NULL;
    }
    Iterator begin()
    {
        return Iterator(this, true);
    }
    Iterator end()
    {
        return Iterator(this, false);
    }
public:
    class Node
    {
    private:
        T data;
        Node *next;
        friend class SLinkedList<T>;
    public:
        Node()
        {
            next = 0;
        }
        Node(Node *next)
        {
            this->next = next;
        }
        Node(T data, Node *next = NULL)
        {
            this->data = data;
            this->next = next;
        }
    };
    class Iterator
    {
    private:
        SLinkedList<T> *pList;
        Node *current;
        int index; // corresponding with current node

```



```

public:
    Iterator(SLinkedList<T> *pList, bool begin);
    Iterator &operator=(const Iterator &iterator);
    void set(const T &e);
    T &operator*();
    bool operator!=(const Iterator &iterator);

    // Prefix ++ overload
    Iterator &operator++();

    // Postfix ++ overload
    Iterator operator++(int);
};
};

```

For example:

Test	Result
<pre> SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); it++){ assert(*it == expvalue); expvalue += 1; } </pre>	
<pre> SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); ++it){ assert(*it == expvalue); expvalue += 1; } </pre>	

Answer: (penalty regime: 0, 0, 0, 5, 10 %)

Reset answer

```

1 template <class T>
2 SLinkedList<T>::Iterator::Iterator(SLinkedList<T>* pList, bool begin)
3 {
4     /*
5      * Constructor of iterator
6      * Set pList to pList
7      * begin = true:
8      * * Set current (index = 0) to pList's head if pList is not NULL
9      * * Otherwise set to NULL (index = -1)
10     * begin = false:
11     * * Always set current to NULL
12     * * Set index to pList's size if pList is not NULL, otherwise 0
13     */
14     this->pList = pList;
15     if(begin){
16         this->current = (pList==nullptr) ? NULL : pList->head;
17         this->index = (pList==nullptr) ? -1 : 0;
18     }

```

```

19  else {
20      this->current = NULL;
21      index = (pList==nullptr) ? 0 : pList->size();
22  }
23
24  }
25
26  template <class T>
27  typename SLinkedList<T>::Iterator& SLinkedList<T>::Iterator::operator=(const Iterator& iterator)
28  {
29      /*
30       * Assignment operator
31       * Set this current, index, plist to iterator corresponding elements.
32       */
33      this->current = iterator.current;
34      this->pList = iterator.pList;
35      this->index = iterator.index;
36      //return SLinkedList;
37      //Iterator newI = Iterator(iterator.pList,false);
38      //newI.current = iterator.current;
39      //newI.index = iterator.index;
40      return *this;
41  }
42
43  template <class T>
44  void SLinkedList<T>::Iterator::remove()
45  {
46      /*
47       * Remove a node which is pointed by current
48       * After remove current points to the previous node of this position (or node with index - 1)
49       * If remove at front, current points to previous "node" of head (current = NULL, index = -1)
50       * Exception: throw std::out_of_range("Segmentation fault!") if remove when current is NULL
51       */
52      if(current == NULL) throw std::out_of_range("Segmentation fault!");
53      if(index == 0) {
54          pList->removeAt(0);
55          current = NULL;
56          index = -1;
57          return;
58      }
59      Node* tmp = pList->head;
60      int i = 0;
61      while(tmp->next != current){
62          tmp = tmp->next;

```

	Test
✓	<pre> SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); it++){ assert(*it == expvalue); expvalue += 1; } </pre>

	Test
✓	<pre>SLinkedList<int> list; int size = 10; for(int idx=0; idx < size; idx++){ list.add(idx); } SLinkedList<int>::Iterator it; int expvalue = 0; for(it = list.begin(); it != list.end(); ++it){ assert(*it == expvalue); expvalue += 1; }</pre>

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.



Câu hỏi 5

Chính xác

Điểm 1,00 của 1,00

Class `LLNode` is used to store a node in a singly linked list, described on the following:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode();
    LLNode(int val, LLNode* next);
}
```

Where `val` is the value of node, `next` is the pointer to the next node.

Request: Implement function:

```
LLNode* addLinkedList(LLNode* l0, LLNode* l1);
```

Where `l0`, `l1` are two linked lists represented positive integers, each node is a digit, the head is the least significant digit (the value of each node is between 0 and 9, the length of each linked list is between 0 and 100000). This function returns the linked list representing the sum of the two integers.

Example:

Given `l0 = [2, 3]` (representing 32) and `l1 = [1, 8]` (representing 81). The result would be `l0 = [3, 1, 1]` (representing 32 + 81 = 113).

Note:

In this exercise, the libraries `iostream`, `string`, `cstring`, `climits`, `utility`, `vector`, `list`, `stack`, `queue`, `map`, `unordered_map`, `set`, `unordered_set`, `functional`, `algorithm` has been included and namespace `std` are used. You can write helper functions and classes. Importing other libraries is allowed, but not encouraged, and may result in unexpected errors.

For example:

Test	Result
<pre>int arr1[] = {2, 9}; int arr2[] = {0, 5}; LLNode* head1 = LLNode::createWithIterators(arr1, arr1 + sizeof(arr1) / sizeof(int)); LLNode* head2 = LLNode::createWithIterators(arr2, arr2 + sizeof(arr2) / sizeof(int)); LLNode* newhead = addLinkedList(head1, head2); LLNode::printList(newhead); head1->clear(); head2->clear(); newhead->clear();</pre>	[2, 4, 1]

Answer: (penalty regime: 0, 0, 0, 5, 10, ... %)

Reset answer

```
1 LLNode* addLinkedList(LLNode* l0, LLNode* l1) {
2     LLNode* tmp0 = l0;
3     LLNode* tmp1 = l1;
4     queue<int> st0;
5     queue<int> st1;
6     //fine value
7     //long long int value0 = 0;
8     //long long int value1 = 0;
9     if (l0 == nullptr && l1 == nullptr) return nullptr;
10    if (l1 == nullptr) {
11        //LLNode* tmp = tmp0;
12        LLNode* newHead = new LLNode(tmp0->val, nullptr);
13        LLNode* tmp = newHead;
14        tmp0 = tmp0->next;
15    } while (tmp0 != nullptr) {
16        LLNode* newNode = new LLNode(tmp0->val, nullptr);
17        tmp->next = newNode;
```



```

18         tmp = newNode;
19         tmp0 = tmp0->next;
20     }
21     return newHead;
22     /*

```

	Test	Expected	Got	
✓	<pre> int arr1[] = {2, 9}; int arr2[] = {0, 5}; LLNode* head1 = LLNode::createWithIterators(arr1, arr1 + sizeof(arr1) / sizeof(int)); LLNode* head2 = LLNode::createWithIterators(arr2, arr2 + sizeof(arr2) / sizeof(int)); LLNode* newhead = addLinkedList(head1, head2); LLNode::printList(newhead); head1->clear(); head2->clear(); newhead->clear(); </pre>	[2, 4, 1]	[2, 4, 1]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.



Câu hỏi 6

Chính xác

Điểm 1,00 của 1,00

Class `LLNode` representing a node of singly linked lists is declared as below:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode(); // Constructor: val = 0, next = nullptr
    LLNode(int val, LLNode* next); // Constructor with customized data
}
```

Given a singly linked list head node and a integer `k`.

Your task is to implement a function with following prototype:

```
LLNode* rotateLinkedList(LLNode* head, int k);
```

The function returns head node of the rotated singly linked list obtained after rotate the linked list to the right by `k` places.

Note:

- The `iostream` library has been used and `namespace std` is being used. No other libraries are allowed.
- The constructors and methods of class `LLNode` have been defined fully so you do not need to redefine them.
- You can write helper functions.

For example:

Test	Result
<pre>int arr[] = {2, 4, 6, 6, 3}; int k = 3; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[2, 4, 6, 6, 3] [6, 6, 3, 2, 4]</pre>

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* rotateLinkedList(LLNode* head, int k) {
2     if(head == nullptr) return nullptr;
3     LLNode* tmp0 = head;
4     if(k==0){
5         LLNode* newHead = new LLNode(tmp0->val, nullptr);
6         LLNode* tmp = newHead;
7         tmp0 = tmp0->next;
8         while (tmp0 != nullptr) {
9             LLNode* newNode = new LLNode(tmp0->val, nullptr);
10            tmp->next = newNode;
11            tmp = newNode;
12            tmp0 = tmp0->next;
13        }
14        return newHead;
15    }
16    //stack<int> result;
17    tmp0 = head;
18    int len = 1;
19    for(len = len; tmp0 != nullptr; len++) tmp0 = tmp0->next;
20    len--;
21    while(k>len) k-=len;
22    int* left = new int[len-k];
```

	Test	Expected	Got	
✓	<pre>int arr[] = {2, 4, 6, 6, 3}; int k = 3; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[2, 4, 6, 6, 3] [6, 6, 3, 2, 4]</pre>	<pre>[2, 4, 6, 6, 3] [6, 6, 3, 2, 4]</pre>	✓
✓	<pre>int arr[] = {}; int k = 2; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[] []</pre>	<pre>[] []</pre>	✓
✓	<pre>int arr[] = {0, 4, 2, 5, 1, 0, 6, 4, 8, 6}; int k = 11; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[0, 4, 2, 5, 1, 0, 6, 4, 8, 6] [6, 0, 4, 2, 5, 1, 0, 6, 4, 8]</pre>	<pre>[0, 4, 2, 5, 1, 0, 6, 4, 8, 6] [6, 0, 4, 2, 5, 1, 0, 6, 4, 8]</pre>	✓
✓	<pre>int arr[] = {6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9, 0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9}; int k = 35; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead);</pre>	<pre>[6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9, 0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9]</pre>	<pre>[6, 1, 3, 2, 6, 0, 0, 0, 3, 3, 9, 8, 5, 6, 0, 7, 7, 8, 5, 7, 7, 9, 6, 3, 3, 0, 0, 8, 0, 0, 4, 9, 7, 1, 7, 2, 7, 5, 4, 4, 7, 5, 9, 2, 4, 5, 7, 9, 7, 9, 7, 2, 0, 6, 7, 6, 5, 1, 9, 7, 1, 2, 7, 8, 7, 5, 4, 7, 6, 9, 0, 2, 7, 0, 5, 5, 6, 8, 3, 1, 9, 3, 0, 1, 4, 6, 6, 9, 2, 2, 0, 6, 7, 4, 4, 6, 0, 7, 3, 5, 2, 9, 1, 0, 9]</pre>	✓

	Test	Expected	Got	
✓	<pre> int arr[] = {9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 4, 4, 0, 6, 4, 5, 3, 0, 3, 9, 7, 1, 7, 2, 5, 0, 1, 9, 1, 2, 5, 6, 8, 7, 1, 6, 9, 6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3}; int k = 196; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> [9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 4, 4, 0, 6, 4, 5, 3, 0, 3, 9, 7, 1, 7, 2, 5, 0, 1, 9, 1, 2, 5, 6, 8, 7, 1, 6, 9, 6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3] [6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, </pre>	<pre> [9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 4, 4, 0, 6, 4, 5, 3, 0, 3, 9, 7, 1, 7, 2, 5, 0, 1, 9, 1, 2, 5, 6, 8, 7, 1, 6, 9, 6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, 1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3] [6, 2, 8, 1, 2, 0, 4, 3, 4, 6, 7, 1, 0, 7, 0, 7, 9, 4, 0, 1, 2, 3, 5, 6, 3, 5, 6, 7, 5, 4, 2, 4, 8, 2, 5, 8, 8, 6, 6, 2, 6, 6, 8, 1, 2, 2, 8, 0, 8, 9, 0, 7, 9, 0, 1, 6, 6, 3, 6, 5, 1, 5, 9, 0, 3, 7, 3, 7, 2, 0, 0, 2, 7, 5, 2, 9, 5, 5, 8, 1, 7, 7, 9, 7, 1, 1, 6, 4, 3, 8, 0, 7, 9, 1, 0, 9, 5, 2, 7, 2, 1, 5, 3, 9, 7, 6, 9, 1, 3, 5, 5, 0, 6, 9, 4, 7, 1, 7, 2, 0, 4, 5, 8, 1, 6, 1, 0, 7, 2, 2, 6, 7, 4, 4, 9, 5, 4, 5, 2, 0, 8, 0, 5, 5, 1, 8, 9, 4, 5, 6, </pre>	✓

Test	Expected	Got
	1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3, 9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 4, 4, 0, 6, 4, 5, 3, 0, 3, 9, 7, 1, 7, 2, 5, 0, 1, 9, 1, 2, 5, 6, 8, 7, 1, 6, 9]	1, 2, 0, 7, 0, 2, 1, 6, 8, 8, 7, 8, 7, 0, 1, 8, 5, 6, 5, 9, 2, 2, 9, 3, 6, 0, 1, 7, 9, 8, 1, 1, 5, 4, 5, 7, 5, 0, 2, 0, 4, 4, 8, 0, 7, 3, 9, 1, 7, 5, 8, 6, 2, 2, 2, 6, 0, 8, 1, 9, 6, 8, 4, 8, 4, 3, 7, 0, 7, 8, 9, 5, 3, 4, 7, 4, 3, 5, 2, 2, 7, 8, 9, 7, 1, 9, 9, 8, 3, 5, 7, 1, 6, 9, 1, 2, 0, 6, 8, 0, 4, 1, 6, 5, 8, 7, 6, 8, 0, 5, 7, 8, 8, 6, 7, 5, 8, 0, 7, 6, 4, 9, 5, 9, 6, 4, 1, 5, 6, 2, 2, 6, 7, 0, 3, 4, 2, 3, 9, 0, 9, 6, 3, 6, 7, 5, 5, 5, 9, 0, 6, 1, 1, 5, 0, 9, 1, 1, 1, 0, 4, 6, 3, 3, 3, 5, 8, 7, 4, 7, 1, 7, 1, 8, 4, 2, 0, 1, 9, 0, 7, 9, 2, 8, 9, 2, 5, 3, 5, 9, 3, 2, 7, 3, 5, 9, 5, 5, 3, 2, 3, 9, 4, 1, 6, 1, 8, 3, 1, 4, 5, 2, 5, 7, 7, 0, 9, 6, 6, 4, 8, 1, 1, 6, 0, 2, 6, 0, 7, 5, 5, 0, 5, 2, 6, 9, 9, 9, 9, 2, 3, 0, 6, 8, 8, 4, 5, 6, 2, 8, 5, 9, 8, 3, 6, 8, 8, 6, 2, 1, 2, 1, 4, 6, 2, 0, 9, 3, 9, 6, 4, 2, 3, 6, 2, 0, 9, 8, 7, 0, 6, 0, 7, 0, 5, 9, 4, 3, 7, 9, 7, 3, 5, 7, 0, 3, 1, 8, 9, 9, 4, 0, 8, 6, 4, 6, 7, 3, 8, 1, 2, 1, 5, 4, 9, 5, 9, 5, 8, 6, 6, 8, 9, 4, 4, 0, 6, 4, 5, 3, 0, 3, 9, 7, 1, 7, 2, 5, 0, 1, 9, 1, 2, 5, 6, 8, 7, 1, 6, 9]

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BỞI HCMUT-CNCP

Test	Expected	Got	
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Test	Expected	Got
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int k = 1000; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> 7, 5, 8, 5, 5, 4, 5, 2, 2, 4, 2, 0, 2, 5, 3, 1, 2, 3, 6, 8, 0, 0, 3, 4, 5, 2, 8, 6, 8, 9, 2, ...snip... 7, 8, 2, 8, 6, 3, 4, 1, 0, 2, 4, 7, 0, 2, 4, 8, 2, 6, 2, 1, 0, 5, 1, 5, 0, 6, 1, 0, 9, 8, 6, 9, 5, 7, 5, 3, 6, 0, 5, 9, 0, 9, 9, 0, 3, 0, 9, 3, 9, 6, 5, 3, 2, 8, 9, 0, 0, 7, 5, 1, 1, 2, 1, 4, 0, 2, 0, 7, 1, 4, 5, 5, 6, 2, 6, 1, 0, 4, 0, 7, 1, 3, 3, 4, 5, 0, 7, 1, 0, 9, 8, 7, 0, 0, 8, 2, 5, 3, 2, 7, 4, 9, 0, 6, 0, 7, 4, 7, 2, 8, 6, 3, 9, 7, 0, 6, 3, 9, 6, 7, 7, 4, 6, 9, 7, 5, 9, 9, 4, 8, 3, 3, 6, 6, 6, 7, 5, 4, 7, 0, 6, 2, 9, 7, 4, 2, 3, 9, 3, 9, 6, 0, 7, 8, 0, 0, 7, 9, 1, 6, 0, 7, 1, 6, 1, 0, 9, 1, 0, 9, 1, 8, 3, 6, 8, 1, 2, 8, 5, 9, 7, 1, 1, 5, 4, 5, 7, 5, 9, 4, 9, 5, 4, 2, 4, 4, 1, 1, 3, 1, 9, 8, 6, 4, 1, 2, 2, 4, 2, 9, 8, 2, 4, 9, 0, 3, 6, 1, 1, 8, 4, 2, 0, 7, 6, 7, 3, 9, 7, 0, 9, 8, 6, 0, 5, 1, 8, 0, 2, 9, 5, 5, 8, 5, 3, 9, 8, 7, 0, 4, 8, 2, 2, 6, 8, 4, 1, 4, 7, 2, 2, 1, 0, 6, 4, 8, 9, 5, 1, 0, 2, 6, 3, 9, 1, 2, 0, 1, 3, 6, 4, 7, 0, 0, 5, 6, 7, 3, 2, 6, 8, 8, 5, 4, 8, 4, 5, 0, 2, 8, 1, 2, 9, 9, 5, 1, 4, 8, 8, 1, 3, 9, 2, 8, 6, 1, 0, 8, 7, 3, 7, 3, 6, 9, 7, 1, 7, 9, 3, 3, 8, 7, 9, 1, 9, 1, 9, 4, 1, 1, 0, 3, 6, 7, 5, 3, 7, 8, 8, 1, 4, 9, 0, 3, 9, 9, 6, 4, 8, 2, 6, 7, 9, 0, 3, 9, 0, 6, 8, 9, 2, 1, 2, 5, 0, 8, 8, 4, 5, 6, 3, 7, 5, 2, 0, 0, 2, 1, 2, 4, 7, 8, 3, 0, 8, 2, 1, 4, 5, 1, 7, 6, 4, 1, 3, 5, 3, 7, 3, 9, 2, 8, 8, 0, 6, 1, 0, 2, 5, 3, 2, 1, 4, 4, 1, 6, 2, 8, 7, 2, 8, 1, 4, 7, 0, 6, 0, 5, 5, 0, 9, 6, 0, 6, 8, 6, 7, 7, 3, 9, 0, 2, 9, 0, 6, 7, 4, 7, 3, 3, 1, 1, 3, 7, 0, 3, 2, 4, 1, 6, 4, 2, 9, 3, 8, 3, 1, 3, 4, 8, 4, 3, 6, 3, 4, 6, 7, 8, 3, 0, 7, 2, 3, 3, 9, 6, 8, 3, 0, 3, 1, 2, 2, 7, 7, 1, 9, 7, 8, 0, 6, 1, 7, 4, 2, 1, 5, 5, 1, 4, 7, 7, 8, 6, 3, 2, 4, 7, 4, 3, 5, 0, 4, 5, 5, 9, 4, 1, 2, 0, 4, 6, 3, 3, 2, 9, 4, 1, 4, 8, 3, 7, 2, 3, 3, 4, 5, 9, 0, 1, 0, 8, 5, 1, 1, 7, 4, 8, 6, 1, 0, 9, 5, 5, 3, 9, 8, 0, 0, 8, 1, 0, 8, 8, 7, 3, 6, 2, 3, 0, 8, 2, 5, 2, 2, 3, 3, 2, 2, 9, 4, 4, 4, 1, 0, 8, 3, 4, 8, 9, 1, 1, 0, 8, 2, </pre>	<pre> 7, 5, 8, 5, 5, 4, 5, 2, 2, 4, 2, 0, 2, 5, 3, 1, 2, 3, 6, 8, 0, 0, 3, 4, 5, 2, 8, 6, 8, 9, 2, ...snip... 7, 8, 2, 8, 6, 3, 4, 1, 0, 2, 4, 7, 0, 2, 4, 8, 2, 6, 2, 1, 0, 5, 1, 5, 0, 6, 1, 0, 9, 8, 6, 9, 5, 7, 5, 3, 6, 0, 5, 9, 0, 9, 9, 0, 3, 0, 9, 3, 9, 6, 5, 3, 2, 8, 9, 0, 0, 7, 5, 1, 1, 2, 1, 4, 0, 2, 0, 7, 1, 4, 5, 5, 6, 2, 6, 1, 0, 4, 0, 7, 1, 3, 3, 4, 5, 0, 7, 1, 0, 9, 8, 7, 0, 0, 8, 2, 5, 3, 2, 7, 4, 9, 0, 6, 0, 7, 4, 7, 2, 8, 6, 3, 9, 7, 0, 6, 3, 9, 6, 7, 7, 4, 6, 9, 7, 5, 9, 9, 4, 8, 3, 3, 6, 6, 6, 7, 5, 4, 7, 0, 6, 2, 9, 7, 4, 2, 3, 9, 3, 9, 6, 0, 7, 8, 0, 0, 7, 9, 1, 6, 0, 7, 1, 6, 1, 0, 9, 1, 0, 9, 1, 8, 3, 6, 8, 1, 2, 8, 5, 9, 7, 1, 1, 5, 4, 5, 7, 5, 9, 4, 9, 5, 4, 2, 4, 4, 1, 1, 3, 1, 9, 8, 6, 4, 1, 2, 2, 4, 2, 9, 8, 2, 4, 9, 0, 3, 6, 1, 1, 8, 4, 2, 0, 7, 6, 7, 3, 9, 7, 0, 9, 8, 6, 0, 5, 1, 8, 0, 2, 9, 5, 5, 8, 5, 3, 9, 8, 7, 0, 4, 8, 2, 2, 6, 8, 4, 1, 4, 7, 2, 2, 1, 0, 6, 4, 8, 9, 5, 1, 0, 2, 6, 3, 9, 1, 2, 0, 1, 3, 6, 4, 7, 0, 0, 5, 6, 7, 3, 2, 6, 8, 8, 5, 4, 8, 4, 5, 0, 2, 8, 1, 2, 9, 9, 5, 1, 4, 8, 8, 1, 3, 9, 2, 8, 6, 1, 0, 8, 7, 3, 7, 3, 6, 9, 7, 1, 7, 9, 3, 3, 8, 7, 9, 1, 9, 1, 9, 4, 1, 1, 0, 3, 6, 7, 5, 3, 7, 8, 8, 1, 4, 9, 0, 3, 9, 9, 6, 4, 8, 2, 6, 7, 9, 0, 3, 9, 0, 6, 8, 9, 2, 1, 2, 5, 0, 8, 8, 4, 5, 6, 3, 7, 5, 2, 0, 0, 2, 1, 2, 4, 7, 8, 3, 0, 8, 2, 1, 4, 5, 1, 7, 6, 4, 1, 3, 5, 3, 7, 3, 9, 2, 8, 8, 0, 6, 1, 0, 2, 5, 3, 2, 1, 4, 4, 1, 6, 2, 8, 7, 2, 8, 1, 4, 7, 0, 6, 0, 5, 5, 0, 9, 6, 0, 6, 8, 6, 7, 7, 3, 9, 0, 2, 9, 0, 6, 7, 4, 7, 3, 3, 1, 1, 3, 7, 0, 3, 2, 4, 1, 6, 4, 2, 9, 3, 8, 3, 1, 3, 4, 8, 4, 3, 6, 3, 4, 6, 7, 8, 3, 0, 7, 2, 3, 3, 9, 6, 8, 3, 0, 3, 1, 2, 2, 7, 7, 1, 9, 7, 8, 0, 6, 1, 7, 4, 2, 1, 5, 5, 1, 4, 7, 7, 8, 6, 3, 2, 4, 7, 4, 3, 5, 0, 4, 5, 5, 9, 4, 1, 2, 0, 4, 6, 3, 3, 2, 9, 4, 1, 4, 8, 3, 7, 2, 3, 3, 4, 5, 9, 0, 1, 0, 8, 5, 1, 1, 7, 4, 8, 6, 1, 0, 9, 5, 5, 3, 9, 8, 0, 0, 8, 1, 0, 8, 8, 7, 3, 6, 2, 3, 0, 8, 2, 5, 2, 2, 3, 3, 2, 2, 9, 4, 4, 4, 1, 0, 8, 3, 4, 8, 9, 1, 1, 0, 8, 2, </pre>

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int k = 990; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> 7, 8, 4, 5, 7, 6, 4, 9, 7, 6, 1, 1, 1, 6, 0, 1, 0, 7, 5, 1, 9, 9, 2, 7, 4, 9, 9, 0, 6, 3, 1, ...snip... 2, 7, 3, 3, 1, 3, 7, 2, 1, 8, 4, 2, 6, 7, 2, 5, 3, 8, 6, 8, 4, 0, 7, 5, 6, 1, 4, 5, 2, 6, 5, 2, 9, 1, 5, 1, 3, 8, 9, 0, 7, 7, 4, 9, 4, 4, 7, 0, 0, 9, 0, 7, 9, 5, 4, 8, 5, 9, 1, 8, 8, 9, 7, 1, 6, 2, 8, 9, 0, 4, 1, 8, 1, 3, 3, 1, 6, 4, 7, 0, 0, 3, 2, 5, 9, 0, 5, 9, 7, 1, 1, 9, 6, 3, 4, 3, 6, 7, 4, 4, 7, 4, 7, 8, 6, 5, 5, 1, 5, 9, 8, 4, 6, 9, 6, 8, 5, 0, 8, 2, 9, 1, 3, 7, 9, 5, 2, 1, 8, 0, 5, 9, 4, 9, 5, 6, 3, 2, 8, 2, 8, 5, 8, 8, 7, 1, 4, 4, 6, 2, 6, 1, 7, 0, 4, 9, 9, 6, 3, 1, 3, 3, 3, 5, 8, 7, 2, 5, 1, 3, 8, 2, 8, 1, 5, 2, 0, 6, 6, 5, 5, 4, 5, 7, 9, 3, 5, 3, 1, 6, 9, 0, 9, 5, 8, 8, 4, 6, 0, 9, 4, 0, 8, 1, 2, 3, 9, 9, 6, 9, 2, 8, 6, 5, 4, 9, 2, 4, 2, 3, 1, 8, 6, 8, 3, 3, 5, 4, 7, 1, 1, 2, 7, 5, 8, 7, 7, 2, 3, 5, 3, 4, 7, 2, 8, 5, 6, 9, 7, 1, 4, 0, 0, 3, 6, 3, 0, 4, 4, 0, 4, 3, 7, 1, 8, 5, 1, 3, 0, 9, 0, 2, 2, 5, 3, 3, 8, 7, 9, 3, 9, 5, 9, 0, 7, 7, 0, 2, 9, 8, 4, 0, 6, 0, 4, 2, 3, 3, 4, 9, 7, 2, 8, 3, 1, 9, 2, 7, 9, 8, 7, 5, 7, 1, 9, 3, 9, 4, 2, 9, 1, 1, 0, 4, 6, 3, 8, 6, 9, 3, 9, 5, 1, 8, 0, 6, 7, 6, 4, 7, 7, 6, 7, 4, 3, 8, 4, 4, 3, 3, 6, 8, 3, 7, 4, 5, 4, 7, 7, 5, 1, 6, 8, 2, 8, 0, 8, 0, 8, 8, 7, 3, 6, 5, 2, 4, 3, 9, 8, 7, 6, 3, 0, 4, 4, 6, 2, 3, 5, 6, 0, 9, 2, 1, 9, 4, 8, 9, 8, 9, 1, 1, 5, 7, 8, 0, 0, 1, 1, 2, 7, 8, 9, 7, 2, 3, 2, 8, 9, 5, 1, 8, 9, 9, 5, 2, 2, 0, 6, 5, 6, 9, 5, 2, 6, 2, 3, 7, 4, 2, 6, 1, 9, 8, 0, 0, 4, 7, 2, 1, 6, 1, 8, 6, 7, 1, 2, 6, 1, 4, 1, 6, 2, 1, 9, 5, 0, 0, 4, 6, 2, 5, 3, 3, 0, 5, 0, 2, 2, 7, 6, 1, 1, 3, 9, 5, 6, 0, 3, 4, 2, 8, 3, 7, 2, 9, 6, 1, 8, 3, 1, 3, 8, 5, 1, 9, 0, 0, 4, 3, 4, 6, 4, 6, 7, 8, 5, 2, 5, 6, 1, 6, 8, 5, 2, 1, 1, 0, 4, 7, 0, 4, 9, 1, 4, 2, 1, 4, 4, 5, 7, 2, 1, 2, 5, 3, 8, 0, 6, 6, 0, 5, 2, 7, 5, 7, 5, 7, 9, 0, 8, 3, 3, 4, 0, 3, 8, 4, 1, 4, 0, 8, 4, 8, 3, 1, 2, 5, 6, 8, 2, 9, 2, 6, 5, 5, 5, 1, 0, 5, 1, 9, 6, 2, 2, 3, 0, 7, 6, 8, 7, 7, 8, 2, 0, 9, 3, 1, 5, 3, 1, 4, 6, 7, 5, </pre>	<pre> 7, 8, 4, 5, 7, 6, 4, 9, 7, 6, 1, 1, 1, 6, 0, 1, 0, 7, 5, 1, 9, 9, 2, 7, 4, 9, 9, 0, 6, 3, 1, ...snip... 2, 7, 3, 3, 1, 3, 7, 2, 1, 8, 4, 2, 6, 7, 2, 5, 3, 8, 6, 8, 4, 0, 7, 5, 6, 1, 4, 5, 2, 6, 5, 2, 9, 1, 5, 1, 3, 8, 9, 0, 7, 7, 4, 9, 4, 4, 7, 0, 0, 9, 0, 7, 9, 5, 4, 8, 5, 9, 1, 8, 8, 9, 7, 1, 6, 2, 8, 9, 0, 4, 1, 8, 1, 3, 3, 1, 6, 4, 7, 0, 0, 3, 2, 5, 9, 0, 5, 9, 7, 1, 1, 9, 6, 3, 4, 3, 6, 7, 4, 4, 7, 4, 7, 8, 6, 5, 5, 1, 5, 9, 8, 4, 6, 9, 6, 8, 5, 0, 8, 2, 9, 1, 3, 7, 9, 5, 2, 1, 8, 0, 5, 9, 4, 9, 5, 6, 3, 2, 8, 2, 8, 5, 8, 8, 7, 1, 4, 4, 6, 2, 6, 1, 7, 0, 4, 9, 9, 6, 3, 1, 3, 3, 3, 5, 8, 7, 2, 5, 1, 3, 8, 2, 8, 1, 5, 2, 0, 6, 6, 5, 5, 4, 5, 7, 9, 3, 5, 3, 1, 6, 9, 0, 9, 5, 8, 8, 4, 6, 0, 9, 4, 0, 8, 1, 2, 3, 9, 9, 6, 9, 2, 8, 6, 5, 4, 9, 2, 4, 2, 3, 1, 8, 6, 8, 3, 3, 5, 4, 7, 1, 1, 2, 7, 5, 8, 7, 7, 2, 3, 5, 3, 4, 7, 2, 8, 5, 6, 9, 7, 1, 4, 0, 0, 3, 6, 3, 0, 4, 4, 0, 4, 3, 7, 1, 8, 5, 1, 3, 0, 9, 0, 2, 2, 5, 3, 3, 8, 7, 9, 3, 9, 5, 9, 0, 7, 7, 0, 2, 9, 8, 4, 0, 6, 0, 4, 2, 3, 3, 4, 9, 7, 2, 8, 3, 1, 9, 2, 7, 9, 8, 7, 5, 7, 1, 9, 3, 9, 4, 2, 9, 1, 1, 0, 4, 6, 3, 8, 6, 9, 3, 9, 5, 1, 8, 0, 6, 7, 6, 4, 7, 7, 6, 7, 4, 3, 8, 4, 4, 3, 3, 6, 8, 3, 7, 4, 5, 4, 7, 7, 5, 1, 6, 8, 2, 8, 0, 8, 0, 8, 8, 7, 3, 6, 5, 2, 4, 3, 9, 8, 7, 6, 3, 0, 4, 4, 6, 2, 3, 5, 6, 0, 9, 2, 1, 9, 4, 8, 9, 8, 9, 1, 1, 5, 7, 8, 0, 0, 1, 1, 2, 7, 8, 9, 7, 2, 3, 2, 8, 9, 5, 1, 8, 9, 9, 5, 2, 2, 0, 6, 5, 6, 9, 5, 2, 6, 2, 3, 7, 4, 2, 6, 1, 9, 8, 0, 0, 4, 7, 2, 1, 6, 1, 8, 6, 7, 1, 2, 6, 1, 4, 1, 6, 2, 1, 9, 5, 0, 0, 4, 6, 2, 5, 3, 3, 0, 5, 0, 2, 2, 7, 6, 1, 1, 3, 9, 5, 6, 0, 3, 4, 2, 8, 3, 7, 2, 9, 6, 1, 8, 3, 1, 3, 8, 5, 1, 9, 0, 0, 4, 3, 4, 6, 4, 6, 7, 8, 5, 2, 5, 6, 1, 6, 8, 5, 2, 1, 1, 0, 4, 7, 0, 4, 9, 1, 4, 2, 1, 4, 4, 5, 7, 2, 1, 2, 5, 3, 8, 0, 6, 6, 0, 5, 2, 7, 5, 7, 5, 7, 9, 0, 8, 3, 3, 4, 0, 3, 8, 4, 1, 4, 0, 8, 4, 8, 3, 1, 2, 5, 6, 8, 2, 9, 2, 6, 5, 5, 5, 1, 0, 5, 1, 9, 6, 2, 2, 3, 0, 7, 6, 8, 7, 7, 8, 2, 0, 9, 3, 1, 5, 3, 1, 4, 6, 7, 5, </pre>

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int k = 11111; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> 2, 8, 7, 0, 1, 4, 4, 8, 9, 7, 4, 1, 1, 9, 4, 1, 0, 9, 5, 8, 6, 6, 9, 1, 5, 6, 0, 8, 0, 3, 3, ...snip... 3, 0, 7, 6, 6, 4, 1, 7, 5, 1, 2, 9, 2, 6, 3, 8, 7, 6, 7, 2, 9, 1, 3, 0, 2, 5, 8, 1, 1, 8, 9, 9, 7, 5, 9, 9, 4, 7, 5, 1, 5, 2, 0, 0, 5, 9, 8, 0, 4, 1, 1, 1, 6, 7, 5, 6, 3, 4, 0, 5, 9, 8, 4, 0, 9, 8, 8, 8, 2, 3, 7, 5, 5, 5, 5, 7, 2, 6, 1, 0, 2, 3, 1, 1, 9, 5, 1, 4, 5, 9, 1, 9, 6, 5, 1, 7, 4, 1, 3, 0, 7, 6, 6, 3, 8, 8, 9, 3, 8, 6, 5, 4, 1, 7, 3, 5, 8, 0, 9, 8, 5, 3, 2, 6, 4, 4, 1, 6, 3, 1, 5, 9, 9, 7, 9, 4, 4, 2, 8, 3, 6, 0, 9, 8, 5, 1, 2, 3, 3, 7, 5, 7, 0, 1, 2, 8, 3, 4, 4, 9, 3, 0, 2, 7, 3, 2, 6, 4, 5, 3, 4, 9, 7, 1, 5, 8, 7, 9, 9, 1, 7, 3, 1, 3, 5, 4, 4, 5, 4, 4, 8, 2, 1, 0, 5, 2, 3, 8, 2, 9, 2, 4, 3, 3, 7, 8, 1, 5, 5, 0, 4, 5, 2, 7, 7, 0, 8, 0, 4, 1, 9, 2, 0, 1, 6, 3, 9, 8, 3, 8, 3, 7, 1, 2, 5, 9, 1, 2, 9, 7, 4, 2, 4, 5, 5, 7, 9, 6, 9, 0, 6, 8, 0, 5, 3, 9, 1, 9, 9, 5, 6, 1, 0, 6, 2, 0, 8, 1, 1, 2, 3, 5, 6, 8, 6, 6, 4, 8, 7, 5, 4, 2, 7, 6, 8, 0, 9, 2, 9, 5, 3, 3, 0, 6, 4, 8, 8, 1, 6, 0, 5, 8, 6, 6, 1, 1, 0, 3, 7, 4, 3, 0, 0, 3, 4, 0, 7, 0, 7, 1, 3, 7, 5, 7, 5, 8, 9, 3, 5, 8, 8, 8, 4, 5, 1, 2, 8, 6, 9, 6, 9, 2, 7, 6, 9, 9, 4, 0, 8, 0, 4, 3, 5, 2, 0, 3, 2, 6, 5, 8, 5, 2, 9, 8, 6, 9, 8, 1, 7, 4, 9, 0, 2, 6, 8, 1, 9, 9, 1, 3, 4, 5, 4, 1, 1, 7, 5, 2, 0, 4, 3, 5, 3, 1, 4, 0, 7, 7, 9, 1, 8, 6, 3, 9, 0, 7, 7, 4, 7, 4, 3, 8, 2, 6, 4, 0, 5, 8, 8, 7, 2, 7, 3, 2, 3, 8, 7, 1, 3, 3, 7, 2, 2, 1, 6, 3, 4, 6, 5, 3, 4, 0, 2, 1, 2, 5, 1, 2, 6, 9, 6, 8, 0, 9, 7, 7, 8, 8, 6, 9, 7, 8, 1, 5, 3, 3, 8, 8, 4, 7, 6, 2, 2, 7, 0, 6, 8, 1, 5, 2, 5, 6, 2, 1, 2, 4, 9, 2, 6, 0, 2, 8, 0, 9, 9, 4, 7, 5, 4, 6, 6, 5, 2, 3, 9, 2, 7, 0, 6, 7, 1, 5, 4, 9, 8, 3, 2, 1, 4, 7, 9, 9, 6, 9, 6, 6, 6, 0, 9, 8, 5, 7, 3, 4, 8, 0, 4, 1, 1, 0, 9, 8, 4, 1, 7, 3, 1, 1, 2, 5, 4, 4, 6, 2, 7, 4, 5, 8, 5, 3, 0, 7, 1, 7, 3, 8, 5, 1, 1, 7, 2, 2, 4, 3, 4, 5, 4, 3, 0, 3, 7, 2, 0, 9, 3, 4, 2, 4, 3, 5, 7, 8, 4, 7, 4, 9, 5, 6, 4, 5, 0, 5, 2, 9, 6, 9, 3, 5, 6, 9, 9, 0, 5, 2, 1, </pre>	<pre> 2, 8, 7, 0, 1, 4, 4, 8, 9, 7, 4, 1, 1, 9, 4, 1, 0, 9, 5, 8, 6, 6, 9, 1, 5, 6, 0, 8, 0, 3, 3, ...snip... 3, 0, 7, 6, 6, 4, 1, 7, 5, 1, 2, 9, 2, 6, 3, 8, 7, 6, 7, 2, 9, 1, 3, 0, 2, 5, 8, 1, 1, 8, 9, 9, 7, 5, 9, 9, 4, 7, 5, 1, 5, 2, 0, 0, 5, 9, 8, 0, 4, 1, 1, 1, 6, 7, 5, 6, 3, 4, 0, 5, 9, 8, 4, 0, 9, 8, 8, 8, 2, 3, 7, 5, 5, 5, 5, 7, 2, 6, 1, 0, 2, 3, 1, 1, 9, 5, 1, 4, 5, 9, 1, 9, 6, 5, 1, 7, 4, 1, 3, 0, 7, 6, 6, 3, 8, 8, 9, 3, 8, 6, 5, 4, 1, 7, 3, 5, 8, 0, 9, 8, 5, 3, 2, 6, 4, 4, 1, 6, 3, 1, 5, 9, 9, 7, 9, 4, 4, 2, 8, 3, 6, 0, 9, 8, 5, 1, 2, 3, 3, 7, 5, 7, 0, 1, 2, 8, 3, 4, 4, 9, 3, 0, 2, 7, 3, 2, 6, 4, 5, 3, 4, 9, 7, 1, 5, 8, 7, 9, 9, 1, 7, 3, 1, 3, 5, 4, 4, 5, 4, 4, 8, 2, 1, 0, 5, 2, 3, 8, 2, 9, 2, 4, 3, 3, 7, 8, 1, 5, 5, 0, 4, 5, 2, 7, 7, 0, 8, 0, 4, 1, 9, 2, 0, 1, 6, 3, 9, 8, 3, 8, 3, 7, 1, 2, 5, 9, 1, 2, 9, 7, 4, 2, 4, 5, 5, 7, 9, 6, 9, 0, 6, 8, 0, 5, 3, 9, 1, 9, 9, 5, 6, 1, 0, 6, 2, 0, 8, 1, 1, 2, 3, 5, 6, 8, 6, 6, 4, 8, 7, 5, 4, 2, 7, 6, 8, 0, 9, 2, 9, 5, 3, 3, 0, 6, 4, 8, 8, 1, 6, 0, 5, 8, 6, 6, 1, 1, 0, 3, 7, 4, 3, 0, 0, 3, 4, 0, 7, 0, 7, 1, 3, 7, 5, 7, 5, 8, 9, 3, 5, 8, 8, 8, 4, 5, 1, 2, 8, 6, 9, 6, 9, 2, 7, 6, 9, 9, 4, 0, 8, 0, 4, 3, 5, 2, 0, 3, 2, 6, 5, 8, 5, 2, 9, 8, 6, 9, 8, 1, 7, 4, 9, 0, 2, 6, 8, 1, 9, 9, 1, 3, 4, 5, 4, 1, 1, 7, 5, 2, 0, 4, 3, 5, 3, 1, 4, 0, 7, 7, 9, 1, 8, 6, 3, 9, 0, 7, 7, 4, 7, 4, 3, 8, 2, 6, 4, 0, 5, 8, 8, 7, 2, 7, 3, 2, 3, 8, 7, 1, 3, 3, 7, 2, 2, 1, 6, 3, 4, 6, 5, 3, 4, 0, 2, 1, 2, 5, 1, 2, 6, 9, 6, 8, 0, 9, 7, 7, 8, 8, 6, 9, 7, 8, 1, 5, 3, 3, 8, 8, 4, 7, 6, 2, 2, 7, 0, 6, 8, 1, 5, 2, 5, 6, 2, 1, 2, 4, 9, 2, 6, 0, 2, 8, 0, 9, 9, 4, 7, 5, 4, 6, 6, 5, 2, 3, 9, 2, 7, 0, 6, 7, 1, 5, 4, 9, 8, 3, 2, 1, 4, 7, 9, 9, 6, 9, 6, 6, 6, 0, 9, 8, 5, 7, 3, 4, 8, 0, 4, 1, 1, 0, 9, 8, 4, 1, 7, 3, 1, 1, 2, 5, 4, 4, 6, 2, 7, 4, 5, 8, 5, 3, 0, 7, 1, 7, 3, 8, 5, 1, 1, 7, 2, 2, 4, 3, 4, 5, 4, 3, 0, 3, 7, 2, 0, 9, 3, 4, 2, 4, 3, 5, 7, 8, 4, 7, 4, 9, 5, 6, 4, 5, 0, 5, 2, 9, 6, 9, 3, 5, 6, 9, 9, 0, 5, 2, 1, </pre>

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int k = 5555; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = rotateLinkedList(head, k); LLNode::printList(newhead); </pre>	<pre> 9, 0, 5, 2, 3, 6, 0, 6, 0, 6, 6, 8, 7, 3, 6, 3, 8, 3, 0, 4, 6, 5, 6, 4, 3, 4, 7, 8, 7, 8, 4, ...snip... 1, 9, 1, 5, 1, 5, 0, 2, 9, 5, 1, 7, 0, 2, 5, 3, 7, 9, 9, 6, 9, 5, 9, 3, 7, 3, 0, 4, 5, 7, 7, 0, 9, 4, 2, 2, 3, 5, 3, 5, 7, 1, 0, 1, 1, 2, 6, 9, 5, 2, 0, 6, 3, 5, 4, 3, 0, 6, 1, 4, 8, 7, 5, 3, 6, 1, 0, 4, 8, 7, 5, 1, 4, 6, 1, 0, 0, 2, 1, 9, 2, 3, 3, 5, 6, 8, 0, 3, 1, 1, 0, 6, 8, 9, 4, 8, 0, 5, 1, 0, 4, 0, 5, 6, 3, 6, 6, 1, 3, 5, 0, 0, 7, 9, 1, 7, 9, 1, 7, 3, 3, 4, 0, 2, 5, 0, 8, 7, 3, 9, 4, 9, 7, 7, 9, 0, 2, 1, 6, 8, 2, 0, 7, 9, 9, 4, 2, 2, 8, 8, 1, 7, 9, 7, 8, 7, 7, 6, 7, 2, 9, 4, 6, 2, 5, 1, 7, 3, 3, 1, 7, 5, 4, 9, 9, 4, 0, 4, 7, 4, 3, 5, 2, 9, 7, 5, 6, 9, 2, 0, 1, 9, 7, 2, 5, 0, 6, 2, 6, 4, 1, 5, 1, 7, 9, 0, 5, 2, 4, 1, 3, 9, 7, 2, 4, 0, 9, 2, 6, 6, 2, 9, 1, 1, 3, 4, 4, 9, 0, 5, 1, 7, 7, 4, 5, 0, 5, 4, 7, 1, 9, 1, 0, 5, 6, 3, 4, 2, 0, 1, 6, 6, 5, 4, 0, 0, 7, 8, 3, 4, 3, 7, 1, 3, 1, 9, 0, 4, 3, 5, 0, 9, 7, 9, 3, 0, 2, 9, 3, 0, 8, 0, 0, 5, 2, 8, 5, 8, 0, 6, 3, 8, 7, 3, 6, 2, 3, 7, 8, 5, 5, 4, 9, 5, 5, 3, 7, 7, 0, 0, 0, 0, 5, 4, 6, 1, 2, 3, 2, 2, 9, 1, 1, 5, 9, 8, 8, 9, 9, 4, 4, 1, 8, 2, 9, 9, 0, 8, 0, 2, 2, 3, 9, 3, 3, 0, 1, 4, 7, 6, 6, 0, 6, 4, 1, 2, 8, 7, 9, 2, 7, 0, 7, 9, 8, 0, 8, 7, 4, 4, 2, 3, 5, 0, 2, 7, 9, 5, 8, 5, 9, 9, 1, 1, 7, 7, 6, 3, 6, 3, 1, 3, 9, 8, 5, 6, 1, 3, 6, 1, 1, 7, 0, 4, 5, 7, 6, 2, 8, 8, 2, 7, 7, 1, 4, 4, 3, 7, 9, 0, 1, 6, 0, 3, 1, 2, 6, 8, 2, 2, 1, 1, 0, 6, 9, 1, 4, 7, 4, 3, 4, 6, 1, 6, 5, 8, 4, 1, 2, 8, 5, 7, 6, 7, 8, 5, 5, 7, 5, 4, 1, 4, 1, 8, 5, 8, 0, 2, 1, 1, 7, 2, 3, 4, 6, 3, 3, 5, 5, 5, 4, 1, 2, 3, 1, 6, 5, 5, 9, 6, 9, 0, 1, 5, 6, 8, 8, 5, 5, 9, 0, 1, 8, 4, 5, 8, 6, 4, 5, 1, 4, 0, 1, 0, 2, 2, 6, 7, 9, 0, 7, 0, 5, 0, 4, 0, 1, 4, 0, 1, 0, 9, 9, 9, 1, 9, 7, 1, 5, 9, 2, 9, 9, 7, 0, 6, 0, 5, 5, 9, 7, 6, 4, 0, 4, 4, 4, 1, 5, 6, 9, 3, 1, 8, 3, 0, 0, 4, 5, 6, 3, 6, 9, 2, 1, 0, 4, 6, 3, 6, 5, 9, 0, 5, 5, 8, 4, 0, 2, 4, 3, 5, 2, 9, 3, 9, 9, 6, 4, 1, 1, 2, 9, 1, 8, 4, 3, 9, 7, 6, 9, 4, 3, 5, 3, </pre>	<pre> 9, 0, 5, 2, 3, 6, 0, 6, 0, 6, 6, 8, 7, 3, 6, 3, 8, 3, 0, 4, 6, 5, 6, 4, 3, 4, 7, 8, 7, 8, 4, ...snip... 1, 9, 1, 5, 1, 5, 0, 2, 9, 5, 1, 7, 0, 2, 5, 3, 7, 9, 9, 6, 9, 5, 9, 3, 7, 3, 0, 4, 5, 7, 7, 0, 9, 4, 2, 2, 3, 5, 3, 5, 7, 1, 0, 1, 1, 2, 6, 9, 5, 2, 0, 6, 3, 5, 4, 3, 0, 6, 1, 4, 8, 7, 5, 3, 6, 1, 0, 4, 8, 7, 5, 1, 4, 6, 1, 0, 0, 2, 1, 9, 2, 3, 3, 5, 6, 8, 0, 3, 1, 1, 0, 6, 8, 9, 4, 8, 0, 5, 1, 0, 4, 0, 5, 6, 3, 6, 6, 1, 3, 5, 0, 0, 7, 9, 1, 7, 9, 1, 7, 3, 3, 4, 0, 2, 5, 0, 8, 7, 3, 9, 4, 9, 7, 7, 9, 0, 2, 1, 6, 8, 2, 0, 7, 9, 9, 4, 2, 2, 8, 8, 1, 7, 9, 7, 8, 7, 7, 6, 7, 2, 9, 4, 6, 2, 5, 1, 7, 3, 3, 1, 7, 5, 4, 9, 9, 4, 0, 4, 7, 4, 3, 5, 2, 9, 7, 5, 6, 9, 2, 0, 1, 9, 7, 2, 5, 0, 6, 2, 6, 4, 1, 5, 1, 7, 9, 0, 5, 2, 4, 1, 3, 9, 7, 2, 4, 0, 9, 2, 6, 6, 2, 9, 1, 1, 3, 4, 4, 9, 0, 5, 1, 7, 7, 4, 5, 0, 5, 4, 7, 1, 9, 1, 0, 5, 6, 3, 4, 2, 0, 1, 6, 6, 5, 4, 0, 0, 7, 8, 3, 4, 3, 7, 1, 3, 1, 9, 0, 4, 3, 5, 0, 9, 7, 9, 3, 0, 2, 9, 3, 0, 8, 0, 0, 5, 2, 8, 5, 8, 0, 6, 3, 8, 7, 3, 6, 2, 3, 7, 8, 5, 5, 4, 9, 5, 5, 3, 7, 7, 0, 0, 0, 0, 5, 4, 6, 1, 2, 3, 2, 2, 9, 1, 1, 5, 9, 8, 8, 9, 9, 4, 4, 1, 8, 2, 9, 9, 0, 8, 0, 2, 2, 3, 9, 3, 3, 0, 1, 4, 7, 6, 6, 0, 6, 4, 1, 2, 8, 7, 9, 2, 7, 0, 7, 9, 8, 0, 8, 7, 4, 4, 2, 3, 5, 0, 2, 7, 9, 5, 8, 5, 9, 9, 1, 1, 7, 7, 6, 3, 6, 3, 1, 3, 9, 8, 5, 6, 1, 3, 6, 1, 1, 7, 0, 4, 5, 7, 6, 2, 8, 8, 2, 7, 7, 1, 4, 4, 3, 7, 9, 0, 1, 6, 0, 3, 1, 2, 6, 8, 2, 2, 1, 1, 0, 6, 9, 1, 4, 7, 4, 3, 4, 6, 1, 6, 5, 8, 4, 1, 2, 8, 5, 7, 6, 7, 8, 5, 5, 7, 5, 4, 1, 4, 1, 8, 5, 8, 0, 2, 1, 1, 7, 2, 3, 4, 6, 3, 3, 5, 5, 5, 4, 1, 2, 3, 1, 6, 5, 5, 9, 6, 9, 0, 1, 5, 6, 8, 8, 5, 5, 9, 0, 1, 8, 4, 5, 8, 6, 4, 5, 1, 4, 0, 1, 0, 2, 2, 6, 7, 9, 0, 7, 0, 5, 0, 4, 0, 1, 4, 0, 1, 0, 9, 9, 9, 1, 9, 7, 1, 5, 9, 2, 9, 9, 7, 0, 6, 0, 5, 5, 9, 7, 6, 4, 0, 4, 4, 4, 1, 5, 6, 9, 3, 1, 8, 3, 0, 0, 4, 5, 6, 3, 6, 9, 2, 1, 0, 4, 6, 3, 6, 5, 9, 0, 5, 5, 8, 4, 0, 2, 4, 3, 5, 2, 9, 3, 9, 9, 6, 4, 1, 1, 2, 9, 1, 8, 4, 3, 9, 7, 6, 9, 4, 3, 5, 3, </pre>

Test	Expected	Got
	7, 0, 7, 7, 9, 4, 8, 7, 5, 7, 2, 6, 1, 6, 6, 2, 2, 2, 6, 4, 5, 1, 4, 5, 6, 5, 7, 5, 5, 9, 7, 8, 6, 1, 1, 8, 1, 2, 8, 9, 4, 8, 3, 0, 6, 9, 1, 6, 7, 7, 1, 6, 6, 6, 7, 4, 3, 2, 9, 2, 5, 5, 8, 9, 4, 7, 5, 0, 1, 9, 2, 0, 0, 8, 9, 0, 8, 7, 8, 3, 6, 6, 2, 6, 5, 2, 0, 5, 6, 1, 9, 2, 1, 7, 2, 7, 1, 6, 5, 4, 3, 1, 0, 3, 4, 1, 1, 3, 4, 9, 8, 1, 6, 9, 4, 7, 1, 8, 4, 4, 9, 4, 3, 4, 0, 6, 0, 5, 9, 4, 4, 2, 8, 4, 3, 5, 8, 7, 4, 1, 7, 4, 6, 3, 1, 5, 6, 4, 2, 6, 4, 6, 1, 1, 2, 3, 4, 5, 6, 5, 3, 8, 1, 8, 8, 9, 5, 4, 3, 3, 5, 4, 3, 7, 7, 0, 2, 8, 2, 5, 0, 4, 1, 6, 0, 9, 5, 5, 6, 3, 8, 4, 9, 8, 8, 0, 9, 6, 3, 8, 8, 2, 4, 1, 5, 2, 1, 2, 3, 4, 1, 2, 9, 4, 8, 6, 6, 9, 9, 0, 8, 5, 8, 5, 0, 2, 4, 8, 8, 6, 4, 9, 5, 5, 8, 9, 1, 5, 7, 8, 5, 5, 4, 0, 3, 3, 2, 2, 3, 5, 1, 1, 6, 4, 4, 9, 3, 7, 3, 6, 0, 9, 3, 3, 4, 4, 7, 9, 9, 8, 0, 1, 2, 4, 6, 6, 1, 9, 7, 5, 3, 1, 6, 3, 6, 3, 3, 8, 1, 3, 4, 7, 9, 7, 3, 4, 3, 7, 1, 4, 9, 8, 3, 6, 2, 2, 8, 9, 5, 6, 6, 6, 2, 2, 9, 5, 8, 3, 2, 0, 9, 1, 9, 4, 4, 1, 7, 6, 4, 0, 1, 4, 3, 8, 7, 1, 4, 1, 4, 1, 0, 1, 0, 4, 6, 0, 8, 6, 0, 5, 8, 8, 9, 9, 7, 6, 7, 5, 8, 3, 2, 3, 2, 7, 3, 8, 3, 6, 2, 3, 3, 1, 4, 3, 4, 1, 5, 5, 8, 0, 2, 1, 5, 7, 0, 7, 1, 9, 2, 6, 6, 7, 6, 9, 0, 6, 3, 0, 0, 8, 1, 2, 5, 4, 2, 6, 5, 3, 8, 5, 8, 3, 0, 9, 8, 0, 1, 4, 4, 7, 9, 4, 2, 9, 6, 2, 3, 4, 4, 4, 5, 0, 1, 7, 9, 2, 6, 0, 4, 2, 5, 1, 3, 6, 9, 6, 8, 9, 0, 2, 5, 5, 8, 3, 2, 4, 9, 2, 4, 6, 8, 1, 9, 4, 9, 5, 5, 7, 4, 3, 2, 4, 1, 8, 0, 2, 3, 8, 0, 1, 6, 3, 6, 2, 5, 6, 0, 3, 1, 7, 7, 4, 6, 5, 6, 3, 7, 1, 4, 0, 9, 3, 2, 7, 3, 1, 2, 3, 7, 9, 5, 4, 1, 6, 6, 5, 6, 7, 7, 2, 4, 6, 9, 8, 1, 6, 3, 8, 5, 2, 9, 8, 5, 8, 5, 7, 1, 5, 0, 0, 8, 2, 1, 9, 7, 2, 9, 3, 7, 6, 2, 5, 2, 7, 3, 4, 3, 7, 5, 3, 9, 9, 9, 3, 7, 6, 5, 6, 9, 9, 2, 0, 8, 1, 9, 1, 8, 8, 8, 6, 9, 2, 3, 3, 5, 2, 8, 0, 0, 3, 5, 5, 1, 3, 3, 2, 1, 7, 7, 2, 2, 0, 5, 9, 5, 6, 7, 8, 5, 9, 5, 8, 6, 7, 0, 9, 9, 6, 3, 8, 1, 4, 8, 7, 2, 1, 1, 2, 0, 3, 6, 7, 3, 5, 9, 2, 2, 2, 2, 7, 8, 2, 5, 8, 8, 7, 0, 0, 3, 4,	7, 0, 7, 7, 9, 4, 8, 7, 5, 7, 2, 6, 1, 6, 6, 2, 2, 2, 6, 4, 5, 1, 4, 5, 6, 5, 7, 5, 5, 9, 7, 8, 6, 1, 1, 8, 1, 2, 8, 9, 4, 8, 3, 0, 6, 9, 1, 6, 7, 7, 1, 6, 6, 6, 7, 4, 3, 2, 9, 2, 5, 5, 8, 9, 4, 7, 5, 0, 1, 9, 2, 0, 0, 8, 9, 0, 8, 7, 8, 3, 6, 6, 2, 6, 5, 2, 0, 5, 6, 1, 9, 2, 1, 7, 2, 7, 1, 6, 5, 4, 3, 1, 0, 3, 4, 1, 1, 3, 4, 9, 8, 1, 6, 9, 4, 7, 1, 8, 4, 4, 9, 4, 3, 4, 0, 6, 0, 5, 9, 4, 4, 2, 8, 4, 3, 5, 8, 7, 4, 1, 7, 4, 6, 3, 1, 5, 6, 4, 2, 6, 4, 6, 1, 1, 2, 3, 4, 5, 6, 5, 3, 8, 1, 8, 8, 9, 5, 4, 3, 3, 5, 4, 3, 7, 7, 0, 2, 8, 2, 5, 0, 4, 1, 6, 0, 9, 5, 5, 6, 3, 8, 4, 9, 8, 8, 0, 9, 6, 3, 8, 8, 2, 4, 1, 5, 2, 1, 2, 3, 4, 1, 2, 9, 4, 8, 6, 6, 9, 9, 0, 8, 5, 8, 5, 0, 2, 4, 8, 8, 6, 4, 9, 5, 5, 8, 9, 1, 5, 7, 8, 5, 5, 4, 0, 3, 3, 2, 2, 3, 5, 1, 1, 6, 4, 4, 9, 3, 7, 3, 6, 0, 9, 3, 3, 4, 4, 7, 9, 9, 8, 0, 1, 2, 4, 6, 6, 1, 9, 7, 5, 3, 1, 6, 3, 6, 3, 3, 8, 1, 3, 4, 7, 9, 7, 3, 4, 3, 7, 1, 4, 9, 8, 3, 6, 2, 2, 8, 9, 5, 6, 6, 6, 2, 2, 9, 5, 8, 3, 2, 0, 9, 1, 9, 4, 4, 1, 7, 6, 4, 0, 1, 4, 3, 8, 7, 1, 4, 1, 4, 1, 0, 1, 0, 4, 6, 0, 8, 6, 0, 5, 8, 8, 9, 9, 7, 6, 7, 5, 8, 3, 2, 3, 2, 7, 3, 8, 3, 6, 2, 3, 3, 1, 4, 3, 4, 1, 5, 5, 8, 0, 2, 1, 5, 7, 0, 7, 1, 9, 2, 6, 6, 7, 6, 9, 0, 6, 3, 0, 0, 8, 1, 2, 5, 4, 2, 6, 5, 3, 8, 5, 8, 3, 0, 9, 8, 0, 1, 4, 4, 7, 9, 4, 2, 9, 6, 2, 3, 4, 4, 4, 5, 0, 1, 7, 9, 2, 6, 0, 4, 2, 5, 1, 3, 6, 9, 6, 8, 9, 0, 2, 5, 5, 8, 3, 2, 4, 9, 2, 4, 6, 8, 1, 9, 4, 9, 5, 5, 7, 4, 3, 2, 4, 1, 8, 0, 2, 3, 8, 0, 1, 6, 3, 6, 2, 5, 6, 0, 3, 1, 7, 7, 4, 6, 5, 6, 3, 7, 1, 4, 0, 9, 3, 2, 7, 3, 1, 2, 3, 7, 9, 5, 4, 1, 6, 6, 5, 6, 7, 7, 2, 4, 6, 9, 8, 1, 6, 3, 8, 5, 2, 9, 8, 5, 8, 5, 7, 1, 5, 0, 0, 8, 2, 1, 9, 7, 2, 9, 3, 7, 6, 2, 5, 2, 7, 3, 4, 3, 7, 5, 3, 9, 9, 9, 3, 7, 6, 5, 6, 9, 9, 2, 0, 8, 1, 9, 1, 8, 8, 8, 6, 9, 2, 3, 3, 5, 2, 8, 0, 0, 3, 5, 5, 1, 3, 3, 2, 1, 7, 7, 2, 2, 0, 5, 9, 5, 6, 7, 8, 5, 9, 5, 8, 6, 7, 0, 9, 9, 6, 3, 8, 1, 4, 8, 7, 2, 1, 1, 2, 0, 3, 6, 7, 3, 5, 9, 2, 2, 2, 2, 7, 8, 2, 5, 8, 8, 7, 0, 0, 3, 4,

Test	Expected	Got
	1, 5, 9, 6, 3, 7, 6, 6, 8, 1, 8, 0, 3, 1, 2, 9, 6, 0, 2, 2, 2, 4, 0, 0, 5, 1, 1, 3, 3, 8, 3, 4, 7, 6, 0, 3, 3, 4, 8, 4, 0, 8, 1, 1, 3, 4, 8, 4, 3, 1, 5, 2, 2, 4, 0, 2, 9, 5, 7, 7, 2, 1, 0, 6, 9, 6]	1, 5, 9, 6, 3, 7, 6, 6, 8, 1, 8, 0, 3, 1, 2, 9, 6, 0, 2, 2, 2, 4, 0, 0, 5, 1, 1, 3, 3, 8, 3, 4, 7, 6, 0, 3, 3, 4, 8, 4, 0, 8, 1, 1, 3, 4, 8, 4, 3, 1, 5, 2, 2, 4, 0, 2, 9, 5, 7, 7, 2, 1, 0, 6, 9, 6]

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.



Câu hỏi 7

Chính xác

Điểm 1,00 của 1,00

Class `LLNode` representing a node of singly linked lists is declared as below:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode(); // Constructor: val = 0, next = nullptr
    LLNode(int val, LLNode* next); // Constructor with customized data
}
```

Given a singly linked list head node.

Your task is to implement a function with following prototype:

```
LLNode* reverseLinkedList(LLNode* head);
```

The function returns head node of the reversed singly linked list.

Note:

- The `iostream` library has been included and `namespace std` is being used. No other libraries are allowed.
- The constructors and methods of class `LLNode` have been defined fully so you do not need to redefine them.
- You can write helper functions.

For example:

Test	Result
<pre>int arr[] = {13, 88, 60, 7, 192}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]</pre>

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* reverseLinkedList(LLNode* head) {
2     if(head == nullptr) return nullptr;
3     LLNode* tmp = head;
4     LLNode* newHead = new LLNode(head->val, nullptr);
5     tmp = tmp->next;
6     while(tmp != nullptr){
7         LLNode* newNode = new LLNode(tmp->val, newHead);
8         newHead = newNode;
9         tmp = tmp->next;
10    }
11    return newHead;
12 }
```

	Test	Expected	Got	
✓	<pre>int arr[] = {13, 88, 60, 7, 192}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]</pre>	<pre>[13, 88, 60, 7, 192] [192, 7, 60, 88, 13]</pre>	✓
✓	<pre>int arr[] = {}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[] []</pre>	<pre>[] []</pre>	✓
✓	<pre>int arr[] = {31, 22, 46, 152, 14, 87, 196, 97, 5, 93}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[31, 22, 46, 152, 14, 87, 196, 97, 5, 93] [93, 5, 97, 196, 87, 14, 152, 46, 22, 31]</pre>	<pre>[31, 22, 46, 152, 14, 87, 196, 97, 5, 93] [93, 5, 97, 196, 87, 14, 152, 46, 22, 31]</pre>	✓
✓	<pre>int arr[] = {115, 59, 178, 39, 109, 18, 154, 106, 94, 174, 51, 33, 132, 195, 161, 37, 61, 107, 120, 190}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[115, 59, 178, 39, 109, 18, 154, 106, 94, 174, 51, 33, 132, 195, 161, 37, 61, 107, 120, 190] [190, 120, 107, 61, 37, 161, 195, 132, 33, 51, 174, 94, 106, 154, 18, 109, 39, 178, 59, 115]</pre>	<pre>[115, 59, 178, 39, 109, 18, 154, 106, 94, 174, 51, 33, 132, 195, 161, 37, 61, 107, 120, 190] [190, 120, 107, 61, 37, 161, 195, 132, 33, 51, 174, 94, 106, 154, 18, 109, 39, 178, 59, 115]</pre>	✓

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TÀI LIỆU SƯU TẬP
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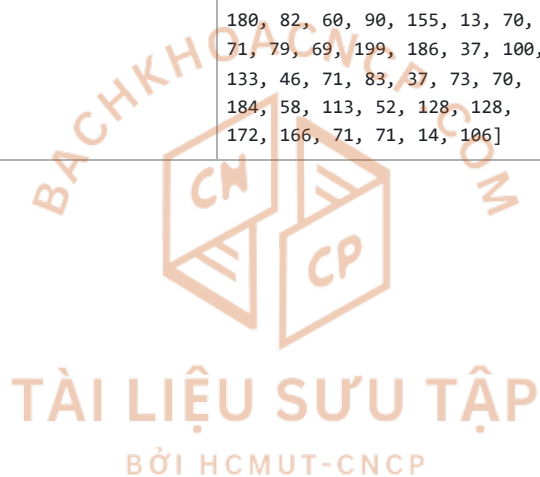
	Test	Expected	Got	
✓	<pre>int arr[] = {104, 50, 154, 40, 15, 171, 56, 114, 67, 90, 46, 179, 152, 177, 139, 45, 18, 55, 38, 158, 8, 157, 143, 37, 16, 83, 173, 82, 156, 51, 124, 25, 68, 51, 194, 105, 44, 17, 97, 0, 150, 66, 71, 81, 11, 180, 148, 160, 127, 93, 108, 13, 122, 172, 39, 88, 62, 38, 61, 156, 45, 131, 69, 191, 123, 42, 103, 56, 69, 138, 185, 162, 192, 147, 71, 80, 12, 36, 191, 121, 194, 86, 92, 183, 164, 97, 185, 130, 29, 174, 112, 194, 185, 132, 27, 197, 158, 151, 51, 174}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear();</pre>	<pre>[104, 50, 154, 40, 15, 171, 56, 114, 67, 90, 46, 179, 152, 177, 139, 45, 18, 55, 38, 158, 8, 157, 143, 37, 16, 83, 173, 82, 156, 51, 124, 25, 68, 51, 194, 105, 44, 17, 97, 0, 150, 66, 71, 81, 11, 180, 148, 160, 127, 93, 108, 13, 122, 172, 39, 88, 62, 38, 61, 156, 45, 131, 69, 191, 123, 42, 103, 56, 69, 138, 185, 162, 192, 147, 71, 80, 12, 36, 191, 121, 194, 86, 92, 183, 164, 97, 185, 130, 29, 174, 112, 194, 185, 132, 27, 197, 158, 151, 51, 174] [174, 51, 151, 158, 197, 27, 132, 185, 194, 112, 174, 29, 130, 185, 97, 164, 183, 92, 86, 194, 121, 191, 36, 12, 80, 71, 147, 192, 162, 185, 138, 69, 56, 103, 42, 123, 191, 69, 131, 45, 156, 61, 38, 62, 88, 39, 172, 122, 13, 108, 93, 127, 160, 148, 180, 11, 81, 71, 66, 150, 0, 97, 17, 44, 105, 194, 51, 68, 25, 124, 51, 156, 82, 173, 83, 16, 37, 143, 157, 8, 158, 38, 55, 18, 45, 139, 177, 152, 179, 46, 90, 67, 114, 56, 171, 15, 40, 154, 50, 104]</pre>	<pre>[104, 50, 154, 40, 15, 171, 56, 114, 67, 90, 46, 179, 152, 177, 139, 45, 18, 55, 38, 158, 8, 157, 143, 37, 16, 83, 173, 82, 156, 51, 124, 25, 68, 51, 194, 105, 44, 17, 97, 0, 150, 66, 71, 81, 11, 180, 148, 160, 127, 93, 108, 13, 122, 172, 39, 88, 62, 38, 61, 156, 45, 131, 69, 191, 123, 42, 103, 56, 69, 138, 185, 162, 192, 147, 71, 80, 12, 36, 191, 121, 194, 86, 92, 183, 164, 97, 185, 130, 29, 174, 112, 194, 185, 132, 27, 197, 158, 151, 51, 174] [174, 51, 151, 158, 197, 27, 132, 185, 194, 112, 174, 29, 130, 185, 97, 164, 183, 92, 86, 194, 121, 191, 36, 12, 80, 71, 147, 192, 162, 185, 138, 69, 56, 103, 42, 123, 191, 69, 131, 45, 156, 61, 38, 62, 88, 39, 172, 122, 13, 108, 93, 127, 160, 148, 180, 11, 81, 71, 66, 150, 0, 97, 17, 44, 105, 194, 51, 68, 25, 124, 51, 156, 82, 173, 83, 16, 37, 143, 157, 8, 158, 38, 55, 18, 45, 139, 177, 152, 179, 46, 90, 67, 114, 56, 171, 15, 40, 154, 50, 104]</pre>	✓

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LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = reverseLinkedList(head); LLNode::printList(newhead); newhead->clear(); </pre>	<pre> 134, 107, 181, 177, 141, 147, 136, 52, 107, 30, 37, 157, 174, 108, 90, 187, 13, 125, 172, 7, 13, 48, 52, 198, 177, 26, 9, 34, 56, 91, 166, 187, 130, 55, 94, 178, 10, 1 ...snip... , 10, 178, 94, 55, 130, 187, 166, 91, 56, 34, 9, 26, 177, 198, 52, 48, 13, 7, 172, 125, 13, 187, 90, 108, 174, 157, 37, 30, 107, 52, 136, 147, 141, 177, 181, 107, 134, 164, 34, 176, 46, 168, 75, 167, 181, 44, 136, 111, 106, 12, 89, 90, 131, 104, 38, 11, 6, 148, 107, 135, 119, 81, 20, 71, 67, 67, 173, 54, 108, 99, 134, 183, 158, 175, 61, 97, 49, 167, 11, 87, 159, 49, 99, 18, 0, 128, 40, 160, 132, 97, 14, 65, 185, 120, 195, 160, 38, 170, 79, 88, 174, 114, 42, 169, 32, 136, 5, 186, 94, 31, 156, 95, 45, 199, 122, 93, 172, 12, 157, 180, 0, 93, 131, 165, 136, 16, 149, 86, 52, 20, 66, 122, 82, 160, 143, 29, 60, 179, 149, 87, 100, 68, 132, 32, 58, 52, 111, 92, 103, 138, 199, 39, 82, 134, 92, 171, 75, 16, 112, 32, 29, 171, 198, 60, 90, 53, 68, 36, 121, 112, 93, 51, 155, 7, 41, 97, 142, 122, 41, 14, 185, 91, 149, 144, 97, 5, 96, 74, 107, 98, 62, 150, 179, 53, 100, 61, 92, 8, 193, 165, 17, 96, 196, 180, 114, 110, 101, 67, 35, 64, 184, 148, 145, 119, 7, 176, 191, 75, 167, 59, 40, 109, 86, 105, 125, 20, 91, 46, 185, 11, 103, 137, 130, 169, 146, 170, 139, 2, 104, 157, 119, 85, 109, 142, 185, 71, 150, 158, 122, 190, 26, 133, 186, 89, 17, 33, 114, 135, 19, 23, 0, 173, 28, 176, 133, 125, 63, 174, 124, 12, 57, 24, 3, 11, 174, 99, 167, 193, 129, 51, 42, 184, 152, 193, 192, 182, 166, 77, 147, 45, 61, 159, 75, 6, 83, 81, 186, 98, 92, 136, 38, 130, 40, 132, 111, 145, 174, 84, 100, 199, 176, 126, 185, 199, 57, 94, 12, 164, 189, 22, 8, 48, 120, 110, 48, 158, 17, 61, 64, 146, 72, 55, 81, 182, 149, 184, 91, 175, 122, 144, 23, 63, 4, 160, 174, 69, 78, 117, 28, 139, 118, 59, 169, 87, 60, 157, 64, 37, 32, 27, 169, 4, 139, 188, 92, 23, 192, 60, 39, 5, 68, 160, 82, 99, 132, 105, 80, 169, 46, 198, 169, 115, 2, 53, </pre>	<pre> 134, 107, 181, 177, 141, 147, 136, 52, 107, 30, 37, 157, 174, 108, 90, 187, 13, 125, 172, 7, 13, 48, 52, 198, 177, 26, 9, 34, 56, 91, 166, 187, 130, 55, 94, 178, 10, 1 ...snip... , 10, 178, 94, 55, 130, 187, 166, 91, 56, 34, 9, 26, 177, 198, 52, 48, 13, 7, 172, 125, 13, 187, 90, 108, 174, 157, 37, 30, 107, 52, 136, 147, 141, 177, 181, 107, 134, 164, 34, 176, 46, 168, 75, 167, 181, 44, 136, 111, 106, 12, 89, 90, 131, 104, 38, 11, 6, 148, 107, 135, 119, 81, 20, 71, 67, 67, 173, 54, 108, 99, 134, 183, 158, 175, 61, 97, 49, 167, 11, 87, 159, 49, 99, 18, 0, 128, 40, 160, 132, 97, 14, 65, 185, 120, 195, 160, 38, 170, 79, 88, 174, 114, 42, 169, 32, 136, 5, 186, 94, 31, 156, 95, 45, 199, 122, 93, 172, 12, 157, 180, 0, 93, 131, 165, 136, 16, 149, 86, 52, 20, 66, 122, 82, 160, 143, 29, 60, 179, 149, 87, 100, 68, 132, 32, 58, 52, 111, 92, 103, 138, 199, 39, 82, 134, 92, 171, 75, 16, 112, 32, 29, 171, 198, 60, 90, 53, 68, 36, 121, 112, 93, 51, 155, 7, 41, 97, 142, 122, 41, 14, 185, 91, 149, 144, 97, 5, 96, 74, 107, 98, 62, 150, 179, 53, 100, 61, 92, 8, 193, 165, 17, 96, 196, 180, 114, 110, 101, 67, 35, 64, 184, 148, 145, 119, 7, 176, 191, 75, 167, 59, 40, 109, 86, 105, 125, 20, 91, 46, 185, 11, 103, 137, 130, 169, 146, 170, 139, 2, 104, 157, 119, 85, 109, 142, 185, 71, 150, 158, 122, 190, 26, 133, 186, 89, 17, 33, 114, 135, 19, 23, 0, 173, 28, 176, 133, 125, 63, 174, 124, 12, 57, 24, 3, 11, 174, 99, 167, 193, 129, 51, 42, 184, 152, 193, 192, 182, 166, 77, 147, 45, 61, 159, 75, 6, 83, 81, 186, 98, 92, 136, 38, 130, 40, 132, 111, 145, 174, 84, 100, 199, 176, 126, 185, 199, 57, 94, 12, 164, 189, 22, 8, 48, 120, 110, 48, 158, 17, 61, 64, 146, 72, 55, 81, 182, 149, 184, 91, 175, 122, 144, 23, 63, 4, 160, 174, 69, 78, 117, 28, 139, 118, 59, 169, 87, 60, 157, 64, 37, 32, 27, 169, 4, 139, 188, 92, 23, 192, 60, 39, 5, 68, 160, 82, 99, 132, 105, 80, 169, 46, 198, 169, 115, 2, 53, </pre>

Test	Expected	Got
	157, 26, 9, 172, 99, 156, 71, 36, 83, 191, 21, 86, 17, 108, 18, 145, 42, 19, 51, 132, 155, 50, 192, 152, 0, 59, 89, 128, 27, 196, 160, 44, 149, 105, 24, 18, 137, 121, 22, 151, 111, 109, 111, 86, 30, 159, 59, 135, 6, 185, 40, 147, 27, 188, 33, 165, 14, 82, 95, 28, 97, 87, 65, 79, 146, 52, 152, 80, 130, 173, 54, 5, 77, 109, 128, 51, 148, 63, 185, 93, 153, 55, 33, 189, 50, 88, 174, 153, 58, 64, 49, 105, 117, 122, 91, 110, 130, 108, 74, 69, 197, 120, 110, 78, 124, 23, 153, 70, 91, 4, 150, 28, 163, 125, 89, 163, 16, 24, 15, 28, 115, 44, 94, 24, 85, 71, 0, 35, 5, 95, 125, 18, 99, 35, 47, 185, 118, 99, 161, 119, 10, 134, 17, 156, 134, 11, 61, 101, 117, 99, 4, 46, 163, 46, 71, 176, 10, 68, 160, 19, 165, 54, 177, 87, 28, 188, 167, 118, 73, 33, 88, 133, 99, 37, 163, 132, 17, 178, 63, 18, 48, 153, 198, 133, 160, 174, 115, 106, 68, 179, 17, 41, 184, 137, 22, 123, 152, 149, 48, 142, 62, 73, 102, 137, 52, 161, 171, 52, 147, 136, 6, 163, 10, 154, 196, 28, 19, 149, 186, 53, 170, 2, 165, 82, 64, 17, 53, 198, 135, 189, 49, 97, 5, 147, 60, 82, 198, 122, 41, 85, 117, 15, 26, 168, 172, 71, 15, 169, 172, 73, 44, 178, 134, 35, 108, 1, 51, 12, 21, 10, 48, 139, 139, 94, 14, 0, 153, 73, 73, 0, 149, 111, 103, 125, 92, 24, 3, 38, 110, 77, 75, 131, 106, 33, 110, 109, 92, 28, 49, 124, 38, 12, 132, 137, 197, 190, 17, 22, 62, 141, 13, 107, 48, 113, 169, 92, 163, 115, 50, 56, 185, 7, 63, 59, 187, 193, 155, 183, 111, 67, 84, 104, 81, 151, 131, 14, 15, 177, 197, 190, 65, 143, 25, 156, 137, 116, 98, 90, 127, 114, 88, 189, 88, 23, 65, 106, 95, 27, 93, 155, 4, 199, 99, 151, 53, 192, 125, 2, 98, 158, 155, 129, 100, 55, 119, 89, 128, 88, 60, 145, 169, 85, 132, 70, 76, 167, 25, 70, 199, 190, 52, 184, 188, 144, 53, 147, 50, 162, 130, 197, 125, 173, 147, 45, 71, 180, 173, 83, 174, 68, 77, 96, 199, 115, 167, 193, 156, 148, 175, 33, 98, 99, 96, 62, 54, 125, 131, 155, 64, 179, 66, 63, 192, 7, 149, 60, 136, 78,	157, 26, 9, 172, 99, 156, 71, 36, 83, 191, 21, 86, 17, 108, 18, 145, 42, 19, 51, 132, 155, 50, 192, 152, 0, 59, 89, 128, 27, 196, 160, 44, 149, 105, 24, 18, 137, 121, 22, 151, 111, 109, 111, 86, 30, 159, 59, 135, 6, 185, 40, 147, 27, 188, 33, 165, 14, 82, 95, 28, 97, 87, 65, 79, 146, 52, 152, 80, 130, 173, 54, 5, 77, 109, 128, 51, 148, 63, 185, 93, 153, 55, 33, 189, 50, 88, 174, 153, 58, 64, 49, 105, 117, 122, 91, 110, 130, 108, 74, 69, 197, 120, 110, 78, 124, 23, 153, 70, 91, 4, 150, 28, 163, 125, 89, 163, 16, 24, 15, 28, 115, 44, 94, 24, 85, 71, 0, 35, 5, 95, 125, 18, 99, 35, 47, 185, 118, 99, 161, 119, 10, 134, 17, 156, 134, 11, 61, 101, 117, 99, 4, 46, 163, 46, 71, 176, 10, 68, 160, 19, 165, 54, 177, 87, 28, 188, 167, 118, 73, 33, 88, 133, 99, 37, 163, 132, 17, 178, 63, 18, 48, 153, 198, 133, 160, 174, 115, 106, 68, 179, 17, 41, 184, 137, 22, 123, 152, 149, 48, 142, 62, 73, 102, 137, 52, 161, 171, 52, 147, 136, 6, 163, 10, 154, 196, 28, 19, 149, 186, 53, 170, 2, 165, 82, 64, 17, 53, 198, 135, 189, 49, 97, 5, 147, 60, 82, 198, 122, 41, 85, 117, 15, 26, 168, 172, 71, 15, 169, 172, 73, 44, 178, 134, 35, 108, 1, 51, 12, 21, 10, 48, 139, 139, 94, 14, 0, 153, 73, 73, 0, 149, 111, 103, 125, 92, 24, 3, 38, 110, 77, 75, 131, 106, 33, 110, 109, 92, 28, 49, 124, 38, 12, 132, 137, 197, 190, 17, 22, 62, 141, 13, 107, 48, 113, 169, 92, 163, 115, 50, 56, 185, 7, 63, 59, 187, 193, 155, 183, 111, 67, 84, 104, 81, 151, 131, 14, 15, 177, 197, 190, 65, 143, 25, 156, 137, 116, 98, 90, 127, 114, 88, 189, 88, 23, 65, 106, 95, 27, 93, 155, 4, 199, 99, 151, 53, 192, 125, 2, 98, 158, 155, 129, 100, 55, 119, 89, 128, 88, 60, 145, 169, 85, 132, 70, 76, 167, 25, 70, 199, 190, 52, 184, 188, 144, 53, 147, 50, 162, 130, 197, 125, 173, 147, 45, 71, 180, 173, 83, 174, 68, 77, 96, 199, 115, 167, 193, 156, 148, 175, 33, 98, 99, 96, 62, 54, 125, 131, 155, 64, 179, 66, 63, 192, 7, 149, 60, 136, 78,

Test	Expected	Got
	172, 115, 10, 168, 158, 63, 28, 117, 81, 24, 40, 89, 67, 57, 184, 89, 160, 13, 10, 15, 37, 23, 152, 147, 188, 96, 99, 116, 88, 13, 121, 167, 67, 24, 180, 45, 199, 86, 85, 58, 98, 121, 25, 148, 172, 24, 146, 193, 149, 61, 72, 117, 59, 79, 162, 100, 89, 88, 167, 99, 14, 55, 178, 20, 116, 49, 173, 27, 183, 117, 4, 99, 145, 46, 46, 61, 116, 125, 31, 195, 103, 30, 137, 184, 36, 67, 68]	172, 115, 10, 168, 158, 63, 28, 117, 81, 24, 40, 89, 67, 57, 184, 89, 160, 13, 10, 15, 37, 23, 152, 147, 188, 96, 99, 116, 88, 13, 121, 167, 67, 24, 180, 45, 199, 86, 85, 58, 98, 121, 25, 148, 172, 24, 146, 193, 149, 61, 72, 117, 59, 79, 162, 100, 89, 88, 167, 99, 14, 55, 178, 20, 116, 49, 173, 27, 183, 117, 4, 99, 145, 46, 46, 61, 116, 125, 31, 195, 103, 30, 137, 184, 36, 67, 68]

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.



Câu hỏi 8

Chính xác

Điểm 1,00 của 1,00

Class LinkedList is used to represent single linked list, described as the following:

```
class LinkedList {
public:
    class Node;
private:
    Node* head;
    Node* tail;
    int size;
public:
    class Node {
    private:
        int value;
        Node* next;
        friend class LinkedList;
    public:
        Node() {
            this->next = NULL;
        }
        Node(Node* node) {
            this->value = node->value;
            this->next = node->next;
        }
        Node(int value, Node* next = NULL) {
            this->value = value;
            this->next = next;
        }
    };
    LinkedList(): head(NULL), tail(NULL), size(0) {}
    void partition(int k);
};
```

In this class; **head**, **tail** and **size** are the pointers of the first element, the last element and size of linked list.

Request: Implement function

```
void LinkedList::partition(int k);
```

To rearrange elements in this linked list by this way: split all elements of this linked list to 3 groups include: group I (the value of each element is smaller than k), group II (the value of each element is equal to k) and group III (the value of each element is larger than k); after that, move group I to the head of linked list, group II is after group I and group III is after group II. Note that the orders of the elements of each group are unchanged.

Example:

- The given linked list: 10->55->45->42->50

- k=45

In this case, group I includes elements with value 10 and 42, group II includes elements with 45 and group III includes elements with value 55 and 50. Rearrange by above way, this linked list will become 10->42->45->55->50 (the orders of the elements in each group is unchanged: 10 before 42 and 55 before 50).

Note: In this exercise, libraries `iostream`, `sstream` and `using namespace std`; have been used. You can add other functions for your answer, but you are not allowed to add other libraries.

For example:

Test	Result
<pre> LinkedList* l1 = new LinkedList(); l1->add(20); l1->add(30); l1->add(10); l1->add(60); l1->add(40); l1->add(45); l1->add(55); l1->partition(45); cout << l1->toString() << "\n"; </pre>	[20,30,10,40,45,60,55]

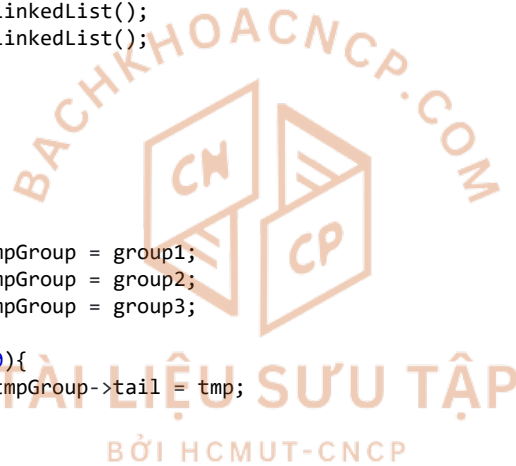
Answer: (penalty regime: 0 %)

Reset answer

```

1
2
3 void LinkedList::partition(int k) {
4     if(size == 0 || size == 1) return;
5     /*Node* tag = head;
6     while(tag->next->value != k) tag = tag->next;
7     Node* leftT = tag;
8     tag = tag->next;
9     Node* rightH = tag->next;
10    //isolation tag
11    leftT->next = nullptr;
12    tag->next = nullptr;*/
13    Node* tmp;
14    LinkedList* group1 = new LinkedList();
15    LinkedList* group2 = new LinkedList();
16    LinkedList* group3 = new LinkedList();
17    while(head!=nullptr){
18        //isolation
19        tmp = head;
20        head = head->next;
21        tmp->next = nullptr;
22        //add
23        LinkedList* tmpGroup;
24        if(tmp->value < k ) tmpGroup = group1;
25        if(tmp->value == k) tmpGroup = group2;
26        if(tmp->value > k ) tmpGroup = group3;
27
28        if(tmpGroup->size == 0){
29            tmpGroup->head = tmpGroup->tail = tmp;
30            tmpGroup->size++;
31        }
32        else{
33            tmpGroup->tail->next = tmp;
34            tmpGroup->tail = tmp;
35            tmpGroup->size++;
36        }
37    }
38    if(group1->size) {
39        head = group1->head;
40        if(group2->size) {
41            group1->tail->next = group2->head;
42            if(group3->size) {
43                group2->tail->next = group3->head;
44                tail = group3->tail;
45            } else tail = group2->tail;
46        } else {
47            if(group3->size) {
48                group1->tail->next = group3->head;
49                tail = group3->tail;
50            } else tail = group1->tail;
51        }
52    } else{
53        if(group2->size){
54            head = group2->head;
55            if(group3->size){
56                group2->tail->next = group3->head;
57                tail = group3->tail;
58            } else tail = group2->tail;
59        } else{
60            if(group3->size){

```



```

61         head = group3->head;
62         tail = group3->tail;
63     } else;
64     }
65 }
66 //delete group1;
67 //delete group2;
68 //delete group3;
69 }

```

	Test	Expected	Got	
✓	<pre> LinkedList* l1 = new LinkedList(); l1->add(20); l1->add(30); l1->add(10); l1->add(60); l1->add(40); l1->add(45); l1->add(55); l1->partition(45); cout << l1->toString() << "\n"; </pre>	[20, 30, 10, 40, 45, 60, 55]	[20, 30, 10, 40, 45, 60, 55]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.



Câu hỏi 9

Chính xác

Điểm 1,00 của 1,00

Polynomials is an important application of arrays and linked lists. A polynomial is composed of different terms where each of them holds a coefficient and an exponent. A polynomial $p(x)$ is the expression in variable x which is in the form $(a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0)$, where a_n, a_{n-1}, \dots, a_0 fall in the category of real numbers and ' n ' is the non-negative integer, which is called the degree of polynomial.

Example: $10x^2 + 26x$, here 10 and 26 are coefficients and 2, 1 is its exponential value.

Points to keep in Mind while working with Polynomials:

- The sign of each coefficient and exponent is stored within the coefficient and the exponent itself.
- The storage allocation for each term in the polynomial must be done in descending order of their exponent.

In this question, complete SLinkedList class is included. You should use this class to complete your Polynomial class with initialized frame as following. This task is implement insertTerm to insert a term into a polynomial.

```
class Polynomial;
class Term {
private:
    double coeff;
    int exp;
    friend class Polynomial;
public:
    Term(double coeff = 0.0, int exp = 0) {
        this->coeff = coeff;
        this->exp = exp;
    }
    bool operator==(const Term& rhs) const {
        return this->coeff == rhs.coeff && this->exp == rhs.exp;
    }
    friend ostream & operator<<(ostream &os, const Term& term) {
        cout << endl;
        cout << "Term: " << "(" << term.coeff << " " << term.exp << ")";
        return os;
    }
};

class Polynomial {
private:
    SLinkedList<Term>* terms;
public:
    Polynomial() {
        this->terms = new SLinkedList<Term>();
    }
    ~Polynomial() {
        this->terms->clear();
    }
    void insertTerm(const Term& term);
    void insertTerm(double coeff, int exp);
    void print() {
        SLinkedList<Term>::Iterator it;
        cout << "[";
        for (it = this->terms->begin(); it != this->terms->end(); it++) {
            cout << (*it);
        }
        cout << endl << "]";
    }
};
```

For example:

Test	Result
<pre>Polynomial *poly = new Polynomial(); poly->insertTerm(6.0, 2); poly->insertTerm(4.0, 5); poly->insertTerm(4.0, 3); poly->insertTerm(6.0, 5); poly->insertTerm(-1.0, 0); poly->insertTerm(-6.0, 6); poly->insertTerm(6.0, 6); poly->print();</pre>	<pre>[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]</pre>
<pre>int n = 5; int coeff[] = { 1, 2, 3, 4, 5 }; int exp[] = { 1, 2, 3, 4, 5 }; Polynomial p1; for (int i = 0; i < n; ++i) p1.insertTerm(coeff[i], exp[i]); p1.print();</pre>	<pre>[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]</pre>

Answer: (penalty regime: 0, 0, 0, 5, 10 %)

Reset answer

```
1 void Polynomial::insertTerm(const Term& term) {
2     // STUDENT ANSWER
3     if(term.coeff == 0) return;
4     if(terms->size() == 0){
5         terms->add(term);
6         return;
7     }
8     SLinkedList<Term>::Iterator tmp;
9     tmp = terms->begin();
10    while(tmp != terms->end()) {
11        if(term.exp < (*tmp).exp) tmp++;
12        else break;
13    }
14    if(!(tmp != terms->end())){
15        terms->add(term);
16        return;
17    }
18    if(term.exp > (*tmp).exp) terms->add(terms->indexOf(*tmp),term);
19    else {
20        if((*tmp).coeff + term.coeff == 0) terms->removeAt(terms->indexOf(*tmp));
21        else (*tmp).coeff += term.coeff;
22    }
23 }
24
25 void Polynomial::insertTerm(double coeff, int exp) {
26     // STUDENT ANSWER
27     Term term = Term(coeff,exp);
28     this->insertTerm(term);
29 }
30 /*
31 term = data
32 SLinkedList() : head(NULL), tail(NULL), count(0){};
33 ~SLinkedList();
34 void add(const T &e);
35 void add(int index, const T &e);
36 T removeAt(int index);
37 bool removeItem(const T &removeItem);
38 bool empty();
39 int size();
40 void clear();
41 T get(int index);
42 void set(int index, const T &e);
43 int indexOf(const T &item);
44 bool contains(const T &item);
```

```

45     string toString(),
46     SLinkedList(const SLinkedList &list)
47 {
48     this->count = 0;
49     this->head = NULL;
50     this->tail = NULL;
51 }
52 Iterator begin()
53 {
54     return Iterator(this, true);
55 }
56 Iterator end()
57 {
58     return Iterator(this, false);
59 }
60 class Iterator
61 {
62 private:
63     SLinkedList<T> *pList;

```

	Test	Expected	Got	
✓	Polynomial *poly = new Polynomial(); poly->insertTerm(6.0, 2); poly->insertTerm(4.0, 5); poly->insertTerm(4.0, 3); poly->insertTerm(6.0, 5); poly->insertTerm(-1.0, 0); poly->insertTerm(-6.0, 6); poly->insertTerm(6.0, 6); poly->print();	[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]	[Term: (10 5) Term: (4 3) Term: (6 2) Term: (-1 0)]	✓
✓	int n = 5; int coeff[] = { 1, 2, 3, 4, 5 }; int exp[] = { 1, 2, 3, 4, 5 }; Polynomial p1; for (int i = 0; i < n; ++i) p1.insertTerm(coeff[i], exp[i]); p1.print();	[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]	[Term: (5 5) Term: (4 4) Term: (3 3) Term: (2 2) Term: (1 1)]	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.

Câu hỏi 10

Chính xác

Điểm 1,00 của 1,00

Cho node root của một danh sách liên kết đơn, hiện thực hàm sau đây:

```
void reduceDuplicate(Node* root);
```

để giảm các phần tử trùng lặp liên tiếp trong danh sách. Nếu có các phần tử liên tiếp giống nhau, ta chỉ giữ lại 1 phần tử.

Ví dụ, ta có 1 danh sách 122234452, sau khi thực hiện hàm reduceDuplicate ta thu được danh sách 123452. (số 2 cuối cùng giữ nguyên do nó không liên tiếp với dãy 222 phía trước)

Lưu ý: Các bạn có thể include thêm thư viện nếu cần thiết

Cấu trúc của một node được cho bên dưới. Các bạn chỉ cần viết nội dung hàm reduceDuplicate, các cấu trúc khác đã được import sẵn.

```
class Node
{
    int data;
    Node* next;
public:
    Node(): data(0), next(nullptr){}

    Node(int data, Node* next)
    {
        this->data = data;
        this->next = next;
    }

    int getData()
    {
        return this->data;
    }

    void setData(int data)
    {
        this->data = data;
    }

    Node* getNext()
    {
        return this->next;
    }

    void setNext(Node* next)
    {
        this->next = next;
    }
};
```

For example:



Test	Result
Node* node1 = new Node(1, nullptr); Node* node2 = new Node(1, node1); Node* node3 = new Node(0, node2); printList(node3); reduceDuplicate(node3); printList(node3);	HEAD -> 0 -> 1 -> 1 -> NULL HEAD -> 0 -> 1 -> NULL

Answer: (penalty regime: 0, 0, 0, 100 %)

Reset answer

```

1 void reduceDuplicate(Node* root)
2 {
3     Node* currentNode = root;
4     Node* nextNode = root->getNext();
5     while(nextNode != nullptr){
6         if(currentNode->getData() == nextNode->getData()){
7             currentNode->setNext(nextNode->getNext());
8             Node* tmp = nextNode;
9             nextNode = nextNode->getNext();
10            delete tmp;
11        }
12        else{
13            currentNode = nextNode;
14            nextNode = nextNode->getNext();
15        }
16    }
17 }
```



	Test	Expected	Got	
✓	<pre>Node* node1 = new Node(1, nullptr); Node* node2 = new Node(1, node1); Node* node3 = new Node(0, node2); printList(node3); reduceDuplicate(node3); printList(node3);</pre>	<pre>HEAD -> 0 -> 1 -> 1 -> NULL HEAD -> 0 -> 1 -> NULL</pre>	<pre>HEAD -> 0 -> 1 -> 1 -> NULL HEAD -> 0 -> 1 -> NULL</pre>	✓

Passed all tests! ✓

Chính xác

Điểm cho bài nộp này: 1,00/1,00.



Câu hỏi 11

Chính xác

Điểm 1,00 của 1,00

Class `LLNode` representing a node of singly linked lists is declared as below:

```
class LLNode {
public:
    int val;
    LLNode* next;
    LLNode(); // Constructor: val = 0, next = nullptr
    LLNode(int val, LLNode* next); // Constructor with customized data
```

Given a singly linked list head node.

Your task is to implement a function with following prototype:

```
LLNode* foldLinkedList(LLNode* head);
```

The function returns head node of the folded singly linked list.

More info:

A folded singly linked list is achieved by taking the first half of the linked list and folding over the second half and merging the intersecting nodes by taking their sum.

Note:

- The `iostream` library has been used and `namespace std` is being used. No other libraries are allowed.
- The constructors and methods of class `LLNode` have been defined fully so you do not need to redefine them.
- You can write helper functions.

For example:

Test	Result
<pre>int arr[] = {9, 5, 7, 5, 0}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[9, 5, 7, 5, 0] [7, 10, 9]</pre>
<pre>int arr[] = {8, 4, 6, 8, 5, 3}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[8, 4, 6, 8, 5, 3] [14, 9, 11]</pre>

Answer: (penalty regime: 0 %)

Reset answer

```
1 LLNode* getNode(int index, LLNode* head){
2     LLNode* tmp = head;
3     if(index == 0) return head;
4     int result = 0;
5     while(result != index){
6         tmp = tmp->next;
7         result++;
8     }
9     return tmp;
10 }
11
12 LLNode* foldLinkedList(LLNode* head) {
13     if(head == nullptr) return nullptr;
14     LLNode* tmp = head;
```

```

15     int count = 0;
16     while(tmp != nullptr) {
17         tmp = tmp->next;
18         count++;
19     }
20     if(count == 1) {
21         LLNode* newHead = new LLNode(head->val, nullptr);
22         return newHead;

```

	Test	Expected	Got	
✓	<pre> int arr[] = {9, 5, 7, 5, 0}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> [9, 5, 7, 5, 0] [7, 10, 9] </pre>	<pre> [9, 5, 7, 5, 0] [7, 10, 9] </pre>	✓
✓	<pre> int arr[] = {8, 4, 6, 8, 5, 3}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> [8, 4, 6, 8, 5, 3] [14, 9, 11] </pre>	<pre> [8, 4, 6, 8, 5, 3] [14, 9, 11] </pre>	✓
✓	<pre> int arr[] = {}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> [] [] </pre>	<pre> [] [] </pre>	✓
✓	<pre> int arr[] = {7, 3, 1, 9, 4, 6, 3, 8, 5, 5}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> [7, 3, 1, 9, 4, 6, 3, 8, 5, 5] [10, 12, 9, 8, 12] </pre>	<pre> [7, 3, 1, 9, 4, 6, 3, 8, 5, 5] [10, 12, 9, 8, 12] </pre>	✓
✓	<pre> int arr[] = {8, 6, 9, 7, 3, 7, 6, 0, 3, 2, 2, 4, 6, 3, 6, 4, 2, 8, 3, 4, 2, 9, 4, 9, 5, 8, 5, 6, 9, 1, 5, 5, 9, 3, 1, 4, 2, 0, 1, 5, 1, 2, 9, 5, 0, 5, 3, 5, 1, 0, 6, 7, 3, 0, 9, 4, 0, 6, 0, 1, 3, 2, 9, 6, 6, 4, 4, 1, 5, 9, 6, 1, 1, 7, 9, 7, 7, 5, 1, 8, 4, 1, 4, 3, 0, 7, 7, 7, 9, 2, 9, 4, 2, 1, 2, 5, 7, 6, 5, 3, 1, 7, 2, 4, 3}; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> [8, 6, 9, 7, 3, 7, 6, 0, 3, 2, 2, 4, 6, 3, 6, 4, 2, 8, 3, 4, 2, 9, 4, 9, 5, 8, 5, 6, 9, 1, 5, 5, 9, 3, 1, 4, 2, 0, 1, 5, 1, 2, 9, 5, 0, 5, 3, 5, 1, 0, 6, 7, 3, 0, 9, 4, 0, 6, 0, 1, 3, 2, 9, 6, 6, 4, 4, 1, 5, 9, 6, 1, 1, 7, 9, 7, 7, 5, 1, 8, 4, 1, 4, 3, 0, 7, 7, 7, 9, 2, 9, 4, 2, 1, 2, 5, 7, 6, 5, 3, 1, 7, 2, 4, 3] [3, 7, 15, 4, 1, 11, 3, 6, 3, 7, 18, 8, 7, 9, 5, 1, 7, 13, 7, 4, 10, 12, 14, 8, 16, 11, 6, 16, 9, 10, 8, 12, 2, 11, 10, 15, 11, 6, 15, 7, 8, 5, 4, 7, 10, 6, 11, 10, 4, 14, 11, 10, 11] </pre>	<pre> [8, 6, 9, 7, 3, 7, 6, 0, 3, 2, 2, 4, 6, 3, 6, 4, 2, 8, 3, 4, 2, 9, 4, 9, 5, 8, 5, 6, 9, 1, 5, 5, 9, 3, 1, 4, 2, 0, 1, 5, 1, 2, 9, 5, 0, 5, 3, 5, 1, 0, 6, 7, 3, 0, 9, 4, 0, 6, 0, 1, 3, 2, 9, 6, 6, 4, 4, 1, 5, 9, 6, 1, 1, 7, 9, 7, 7, 5, 1, 8, 4, 1, 4, 3, 0, 7, 7, 7, 9, 2, 9, 4, 2, 1, 2, 5, 7, 6, 5, 3, 1, 7, 2, 4, 3] [3, 7, 15, 4, 1, 11, 3, 6, 3, 7, 18, 8, 7, 9, 5, 1, 7, 13, 7, 4, 10, 12, 14, 8, 16, 11, 6, 16, 9, 10, 8, 12, 2, 11, 10, 15, 11, 6, 15, 7, 8, 5, 4, 7, 10, 6, 11, 10, 4, 14, 11, 10, 11] </pre>	✓

	Test	Expected	Got	
✓	<pre>int arr[] = {5, 8, 9, 4, 1, 3, 8, 2, 3, 3, 5, 5, 6, 8, 8, 7, 4, 8, 1, 5, 8, 5, 2, 5, 0, 9, 7, 0, 8, 1, 1, 3, 4, 8, 4, 0, 5, 1, 6, 6, 0, 2, 5, 2, 8, 2, 0, 8, 3, 0, 9, 4, 5, 2, 9, 3, 2, 2, 7, 0, 3, 7, 7, 2, 8, 0, 7, 4, 5, 9, 7, 2, 6, 3, 4, 3, 1, 2, 2, 6, 2, 7, 3, 1, 9, 7, 1, 9, 6, 2, 6, 8, 1, 1, 2, 9, 7, 6, 8, 6, 2, 9, 0, 8, 9, 0, 3, 0, 1, 6, 4, 3, 4, 5, 1, 8, 0, 6, 8, 2, 2, 3, 4, 3, 0, 5, 5, 1, 9, 8, 4, 9, 4, 9, 8, 9, 7, 6, 1, 3, 8, 8, 6, 3, 0, 7, 3, 0, 9, 8, 1, 7, 8, 4, 8, 1, 4, 2, 2, 3, 8, 7, 2, 8, 0, 8, 8, 4, 2, 9, 5, 1, 6, 4, 2, 9, 5, 4, 2, 7, 6, 8, 4, 9, 6, 5, 1, 0, 5, 6, 7, 3, 2, 7, 0, 8, 7, 8, 4, 0, 3, 7, 5, 2, 5, 3, 9, 1, 2, 5, 1, 1, 2, 7, 4, 6, 1, 6, 3, 0, 2, 4, 8, 5, 9, 0, 6, 0, 1, 7, 4, 1, 5, 6, 3, 9, 5, 2, 7, 0, 4, 4, 0, 8, 5, 4, 8, 5, 0, 8, 9, 7, 3, 6, 4, 4, 5, 0, 5, 0, 7, 9, 3, 4, 7, 2, 7, 9, 2, 1, 0, 9, 1, 3, 8, 5, 9, 4, 0, 5, 9, 9, 5, 1, 1, 0, 2, 9, 8, 8, 8, 8, 2, 2, 5, 8, 3, 0, 5, 9, 5, 8, 7, 0, 6, 6, 2, 3, 5, 9, 0, 1, 9, 7, 1, 4, 5, 1, 5, 5, 3, 7, 2, 6, 4, 1, 3, 2, 4, 6, 5, 2, 4, 1, 1, 3, 5, 6, 2, 0, 0, 5, 4, 7, 8, 4, 3, 1, 7, 1, 9, 3, 8, 0, 7, 8, 0, 3, 6, 3, 8, 0, 3, 1, 7, 2, 1, 7, 9]; LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead);</pre>	<pre>[5, 8, 9, 4, 1, 3, 8, 2, 3, 3, 5, 5, 6, 8, 8, 7, 4, 8, 1, 5, 8, 5, 2, 5, 0, 9, 7, 0, 8, 1, 1, 3, 4, 8, 4, 0, 5, 1, 6, 6, 0, 2, 5, 2, 8, 2, 0, 8, 3, 0, 9, 4, 5, 2, 9, 3, 2, 2, 7, 0, 3, 7, 7, 2, 8, 0, 7, 4, 5, 9, 7, 2, 6, 3, 4, 3, 1, 2, 2, 6, 2, 7, 3, 1, 9, 7, 1, 9, 6, 2, 6, 8, 1, 1, 2, 9, 7, 6, 8, 6, 2, 9, 0, 8, 9, 0, 3, 0, 1, 6, 4, 3, 4, 5, 1, 8, 0, 6, 8, 2, 2, 3, 4, 3, 0, 5, 5, 1, 9, 8, 4, 9, 4, 9, 8, 9, 7, 6, 1, 3, 8, 8, 6, 3, 0, 7, 3, 0, 9, 8, 1, 7, 8, 4, 8, 1, 4, 2, 2, 3, 8, 7, 2, 8, 0, 8, 8, 4, 2, 9, 5, 4, 2, 7, 6, 8, 4, 9, 6, 5, 1, 0, 5, 6, 7, 3, 2, 7, 0, 8, 7, 5, 0, 6, 3, 7, 5, 5, 9, 4, 5, 1, 4, 3, 6, 3, 2, 5, 9, 7, 8, 5, 0, 9, 1, 8, 7, 6, 1, 0, 5, 5, 7, 1, 8, 9, 8, 7, 7, 2, 9, 5, 8, 9, 3, 8, 4, 4, 7, 1, 7, 2, 6, 1, 6, 8, 8, 8, 7, 0, 8, 0, 5, 6, 8, 6, 8, 8, 4, 0, 6, 7, 5, 3, 6, 6, 2, 1, 9, 1, 9, 3, 0, 5, 5, 2, 1, 2, 7, 4, 9, 6, 6, 5, 3, 5, 6, 9, 8, 6, 8, 2, 7, 3, 4, 2, 6, 3, 0, 5, 9, 0, 9, 9, 7, 0, 8, 6, 9, 8, 7, 8, 4, 0, 8, 0, 3, 0, 1, 8, 4, 5, 0, 2, 7, 0, 7, 8, 4, 0, 3, 7, 5, 2, 5, 3, 9, 1, 2, 5, 1, 1, 2, 7, 4, 6, 1, 6, 3, 0, 2, 4, 8, 5, 9, 0, 6, 0, 1, 7, 4, 1, 5, 6, 3, 9, 5, 2, 7, 0, 4, 4, 0, 8, 5, 4, 8, 5, 0, 8, 9, 7, 3, 6, 4, 4, 5, 0, 5, 0, 7, 9, 3, 4, 7, 2, 7, 9, 2, 1, 0, 9, 1, 3, 8, 5, 9, 4, 0, 5, 9, 9, 5, 1, 1, 0, 2, 9, 8, 8, 8, 8, 8, 2, 2, 5, 8, 3, 0, 5, 9, 5, 8, 7, 0, 6, 6, 2, 3, 5, 9, 0, 1, 9, 7, 1, 4, 5, 1, 5, 5, 3, 7, 2, 6, 4, 1, 3, 2, 4, 6, 5, 2, 4, 1, 1, 3, 5, 6, 2, 0, 0, 5, 4, 7, 8, 4, 3, 1, 7, 1, 9, 3, 8, 0, 7, 8, 0, 3, 6, 3, 8, 0, 3, 1, 7, 2, 1, 7, 9]</pre>	<pre>[5, 8, 9, 4, 1, 3, 8, 2, 3, 3, 5, 5, 6, 8, 8, 7, 4, 8, 1, 5, 8, 5, 2, 5, 0, 9, 7, 0, 8, 1, 1, 3, 4, 8, 4, 0, 5, 1, 6, 6, 0, 2, 5, 2, 8, 2, 0, 8, 3, 0, 9, 4, 5, 2, 9, 3, 2, 2, 7, 0, 3, 7, 7, 2, 8, 0, 7, 4, 5, 9, 7, 2, 6, 3, 4, 3, 1, 2, 2, 6, 2, 7, 3, 1, 9, 7, 1, 9, 6, 2, 6, 8, 1, 1, 2, 9, 7, 6, 8, 6, 2, 9, 0, 8, 9, 0, 3, 0, 1, 6, 4, 3, 4, 5, 1, 8, 0, 6, 8, 2, 2, 3, 4, 3, 0, 5, 5, 1, 9, 8, 4, 9, 4, 9, 8, 9, 7, 6, 1, 3, 8, 8, 6, 3, 0, 7, 3, 0, 9, 8, 1, 7, 8, 4, 8, 1, 4, 2, 2, 3, 8, 7, 2, 8, 0, 8, 8, 4, 2, 9, 5, 4, 2, 7, 6, 8, 4, 9, 6, 5, 1, 0, 5, 6, 7, 3, 2, 7, 0, 8, 7, 5, 0, 6, 3, 7, 5, 5, 9, 4, 5, 1, 4, 3, 6, 3, 2, 5, 9, 7, 8, 5, 0, 9, 1, 8, 7, 6, 1, 0, 5, 5, 7, 1, 8, 9, 8, 7, 7, 2, 9, 5, 8, 9, 3, 8, 4, 4, 7, 1, 7, 2, 6, 1, 6, 8, 8, 8, 7, 0, 8, 0, 5, 6, 8, 6, 8, 8, 4, 0, 6, 7, 5, 3, 6, 6, 2, 1, 9, 1, 9, 3, 0, 5, 5, 2, 1, 2, 7, 4, 9, 6, 6, 5, 3, 5, 6, 9, 8, 6, 8, 2, 7, 3, 4, 2, 6, 3, 0, 5, 9, 0, 9, 9, 7, 0, 8, 6, 9, 8, 7, 8, 4, 0, 8, 0, 3, 0, 1, 8, 4, 5, 0, 2, 7, 0, 7, 8, 4, 0, 3, 7, 5, 2, 5, 3, 9, 1, 2, 5, 1, 1, 2, 7, 4, 6, 1, 6, 3, 0, 2, 4, 8, 5, 9, 0, 6, 0, 1, 7, 4, 1, 5, 6, 3, 9, 5, 2, 7, 0, 4, 4, 0, 8, 5, 4, 8, 5, 0, 8, 9, 7, 3, 6, 4, 4, 5, 0, 5, 0, 7, 9, 3, 4, 7, 2, 7, 9, 2, 1, 0, 9, 1, 3, 8, 5, 9, 4, 0, 5, 9, 9, 5, 1, 1, 0, 2, 9, 8, 8, 8, 8, 8, 2, 2, 5, 8, 3, 0, 5, 9, 5, 8, 7, 0, 6, 6, 2, 3, 5, 9, 0, 1, 9, 7, 1, 4, 5, 1, 5, 5, 3, 7, 2, 6, 4, 1, 3, 2, 4, 6, 5, 2, 4, 1, 1, 3, 5, 6, 2, 0, 0, 5, 4, 7, 8, 4, 3, 1, 7, 1, 9, 3, 8, 0, 7, 8, 0, 3, 6, 3, 8, 0, 3, 1, 7, 2, 1, 7, 9]</pre>	✓

Test	Expected	Got
	3, 10, 11, 15, 9, 6, 12, 5, 10, 4, 8, 4, 13, 10, 3, 7, 7, 11, 15, 9, 11, 3, 6, 17, 7, 10, 17, 7, 10, 5, 8, 11, 11, 15, 14, 2, 8, 9, 3, 12, 15, 10, 14, 10, 10, 3, 5, 9, 11, 9, 2, 12, 18, 10, 12, 14, 0, 14, 8, 9, 10, 8, 9, 7, 3, 11, 10, 10, 6, 10, 5, 14, 5, 6, 15, 2, 8, 12, 3, 8, 4, 4, 12, 11, 3, 9, 1, 5, 11, 9, 9, 3, 1, 8, 5, 11, 16, 8, 9, 5, 6, 15, 6, 10, 11, 12, 7, 15, 16, 6, 8, 11, 6, 11, 2, 11, 4, 8, 6, 10, 15, 14]	3, 10, 11, 15, 9, 6, 12, 5, 10, 4, 8, 4, 13, 10, 3, 7, 7, 11, 15, 9, 11, 3, 6, 17, 7, 10, 17, 7, 10, 5, 8, 11, 11, 15, 14, 2, 8, 9, 3, 12, 15, 10, 14, 10, 10, 3, 5, 9, 11, 9, 2, 12, 18, 10, 12, 14, 0, 14, 8, 9, 10, 8, 9, 7, 3, 11, 10, 10, 6, 10, 5, 14, 5, 6, 15, 2, 8, 12, 3, 8, 4, 4, 12, 11, 3, 9, 1, 5, 11, 9, 9, 3, 1, 8, 5, 11, 16, 8, 9, 5, 6, 15, 6, 10, 11, 12, 7, 15, 16, 6, 8, 11, 6, 11, 2, 11, 4, 8, 6, 10, 15, 14]



	Test	Expected	Got	
✓	<pre>int arr[] = {0, 5, 7, 0, 9, 2, 8, 3, 2, 2, 9, 3, 7, 2, 8, 0, 1, 4, 7, 3, 4, 0, 4, 5, 2, 0, 3, 1, 5, 3, 0, 2, 8, 7, 7, 1, 5, 3, 7, 9, 6, 4, 9, 8, 5, 5, 4, 3, 6, 9, 8, 0, 4, 5, 9, 4, 1, 5, 4, 2, 6, 4, 2, 1, 3, 1, 4, 6, 9, 0, 9, 6, 9, 9, 2, 0, 8, 9, 4, 9, 7, 0, 0, 5, 1, 2, 5, 2, 7, 5, 3, 3, 9, 8, 6, 5, 7, 9, 7, 3, 3, 0, 5, 9, 1, 2, 0, 2, 8, 5, 6, 3, 2, 7, 8, 6, 1, 5, 7, 1, 4, 9, 3, 2, 6, 1, 7, 9, 9, 4, 0, 9, 9, 2, 1, 1, 4, 3, 8, 7, 0, 8, 5, 0, 2, 8, 9, 6, 6, 8, 0, 6, 4, 2, 5, 1, 7, 2, 1, 3, 1, 6, 9, 0, 3, 9, 6, 2, 8, 7, 8, 1, 8, 6, 8, 0, 5, 4, 8, 0, 0, 6, 7, 4, 3, 5, 6, 3, 2, 2, 8, 2, 6, 3, 7, 9, 7, 2, 0, 3, 7, 6, 7, 6, 3, 3, 0, 4, 3, 2, 4, 3, 1, 4, 1, 5, 0, 3, 7, 4, 4, 0, 3, 9, 0, 4, 1, 7, 6, 6, 3, 7, 0, 4, 3, 6, 9, 2, 6, 7, 8, 4, 7, 5, 8, 0, 3, 4, 0, 1, 9, 2, 9, 8, 8, 3, 9, 9, 6, 2, 0, 1, 4, 2, 1, 4, 9, 4, 3, 7, 9, 7, 0, 0, 2, 7, 7, 4, 5, 2, 9, 9, 2, 1, 5, 4, 0, 9, 1, 0, 9, 3, 9, 5, 2, 6, 8, 4, 0, 0, 1, 0, 0, 5, 9, 1, 2, 8, 4, 7, 2, 3, 2, 7, 5, 4, 8, 2, 0, 7, 7, 8, 6, 0, 1, 5, 5, 1, 4, 2, 4, 1, 4, 1, 4, 5, 0, 7, 7, 6, 4, 0, 1, 5, 5, 1, 4, 2, 4, 1, 4, 1, 4, 5, 0, 7, 7, 6, 4, 0, 3, 9, 3, 9, 5, 7, 2, 6, 2, 9, 7, 9, 0, 3, 1, 0, 2, 9, 7, 5, 1, 0, 2, 9, 7, 5, 4, 8, 2, 0, 7, 2, 3, 2, 7, 5, 4, 8, 2, 0, 7, 8, 6, 0, 1, 5, 5, 1, 4, 2, 4, 1, 4, 1, 4, 5, 0, 7, 7, 6, 4, 7, 3, 9, 3, 9, 5, 7, 2, 6, 2, 9, 7, 9, 0, 3, 1, 0, 2, 9, 7, 5, 1, 3, 1, 5, 5, 9, 2, 3, 8, 5, 5, 6, 0, 9, 1, 0, 0, 5, 2, 5, 6, 0, 7, 6, 3, 4, 9, 4, 5, 9, 0, 3, 0, 2, 8, 7, 6, 4, 0, 9, 9, 6, 8, 1, 1, 3, 0, 7, 7, 4, 8, 1, 6, 4, 2, 4, 6, 4, 7, 7, 2, 5, 8, 6, 8, 5, 3, 6, 1, 8, 5, 2, 8, 6, 8, 6, 0, 2, 5, 0, 4, 1, 8, 4, 2, 2, 3, 1, 0, 4, 8, 5, 3, 2, 7, 1, 7, 1, 8, 7, 8, 0, 9, 6, 1, 9, 1, 6, 7, 5, 3, 8, 3, 1, 9, 8, 0, 4, 3, 4, 0, 5, 7, 3, 0, 8, 1, 0, 7, 3, 4, 0, 8, 5, 0, 8, 7, 4, 7, 3, 5, 3, 2, 5, 2, 0, 1, 0, 0, 5, 9, 1, 2, 8, 4, 7, 1, 0, 0, 5, 9, 1, 2, 8, 4, 7, 2, 3, 2, 7, 5, 4, 8, 2, 0, 7, 8, 6, 0, 1, 5, 5, 1, 4, 2, 4, 1, 4, 1, 4, 5, 0, 7, 7, 6, 4, 7, 3, 9, 3, 9, 5, 7, 2, 6, 2, 9, 7, 9, 0, 3, 1, 0, 2, 9, 7, 5, 1, 3, 1, 5, 5, 9, 2, 3, 8, 5, 5, 6, 0, 9, 1, 0, 0, 5, 2, 5, 6, 0, 7, 6, 3, 4, 9, 4, 5, 9, 0, 3, 0, 2, 8, 7, 6, 4, 0, 9, 9, 6, 8, 1, 1, 3, 0, 7, 7, 4, 8, 1, 6, 4, 2, 4, 6, 4, 7, 7, 2, 5, 8, 6, 8, 5, 3, 6, 1, 8, 5, 2, 8, 6, 8, 6, 0, 2, 5, 0, 4, 1, 8, 4, 2, 2, 3, 1, 0, 4, 8, 5, 3, 2, 7, 1, 7, 1, 8, 7, 8, 0, 9, 6, 1, 9, 1, 6, 7, 5, 3, 8, 3, 1, 9, 8, 0, 4, 3, 4, 0, 5, 7, 3, 0, 8, 1, 0, 7, 3, 4, 0, 8, 5, 0, 8, 7, 4, 7, 3, 5, 3, 2, 5, 2, 5, 2, 0, 1, 9, 0, 1, 7, 6, 2, 3, 1, 9, 5, 7, 2, 8, 2, 2, 9, 1, 1, 0, 1, 2, 2, 9, 2, 3, 0, 6, 8, 0, 3, 8, 0, 4, 2, 5, 4, 7, 6, 8, 0, 2, 4, 9, 2, 1, 9, 3, 6, 0, 3, 1, 5, 6, 2, 5, 4, 3, 8, 6, 9, 4, 1, 6, 8, 6, 6, 5, 1, 0, 3, 3, 8, 4, 5, 8, 9, 5, 6, 5, 4, 0, 6, 7, 2, 6, 1, 6, 4, 6, 9, 6, 2, 0, 8, 2, 3, 7, 0, 7, 4, 1, 0, 3, 7, 9, 5, 9, 1, 5, 5, 7, 6, 2, 4, 6, 8, 0, 7, 9, 6}; 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LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> 5, 0, 8, 7, 9, 7, 5, 6, 9, 2, 3, 1, 8, 0, 9, 6, 0, 2, 5, 6, 1, 3, 7, 3, 4, 7, 2, 3, 0, 0, 5, ...snip... , 6, 6, 11, 13, 15, 9, 11, 4, 13, 12, 12, 9, 13, 12, 12, 9, 10, 16, 13, 8, 15, 4, 16, 4, 3, 7, 4, 8, 8, 5, 7, 7, 15, 13, 6, 6, 10, 15, 7, 8, 10, 8, 12, 8, 7, 7, 2, 10, 10, 10, 6, 12, 7, 10, 2, 1, 15, 12, 2, 15, 10, 5, 9, 5, 12, 10, 17, 9, 3, 14, 12, 2, 6, 3, 7, 12, 2, 15, 6, 13, 5, 8, 9, 10, 4, 10, 8, 14, 4, 3, 4, 12, 8, 4, 1, 8, 9, 9, 16, 13, 10, 10, 9, 16, 4, 6, 6, 0, 8, 9, 9, 12, 9, 12, 12, 15, 10, 11, 7, 10, 17, 11, 6, 13, 4, 11, 14, 6, 14, 10, 15, 6, 2, 14, 6, 3, 16, 14, 9, 5, 15, 6, 6, 10, 10, 13, 6, 11, 12, 16, 12, 11, 10, 1, 8, 12, 7, 7, 15, 7, 8, 10, 16, 12, 9, 4, 9, 16, 14, 9, 7, 10, 4, 1, 9, 10, 12, 5, 0, 11, 7, 8, 3, 6, 15, 11, 11, 9, 3, 17, 11, 3, 12, 11, 14, 9, 13, 6, 8, 16, 6, 13, 6, 12, 6, 9, 9, 6, 1, 2, 2, 12, 18, 3, 4, 0, 6, 8, 10, 8, 10, 10, 5, 4, 1, 12, 11, 11, 17, 7, 2, 8, 8, 8, 10, 6, 13, 5, 13, 7, 3, 6, 15, 13, 7, 12, 8, 17, 8, 3, 12, 8, 16, 12, 13, 6, 9, 2, 11, 5, 9, 10, 8, 15, 9, 10, 9, 7, 16, 12, 6, 6, 8, 9, 17, 5, 12, 11, 15, 11, 5, 11, 11, 11, 11, 3, 5, 8, 13, 9, 11, 11, 7, 13, 6, 8, 13, 9, 9, 14, 2, 15, 6, 6, 2, 13, 10, 13, 13, 10, 10, 10, 15, 16, 1, 5, 11, 3, 8, 4, 4, 10, 10, 1, 3, 18, 10, 6, 13, 14, 15, 8, 10, 10, 9, 10, 5, 11, 16, 7, 8, 6, 2, 9, 1, 8, 3, 7, 3, 5, 13, 11, 10, 7, 11, 5, 13, 17, 13, 15, 12, 13, 9, 1, 4, 11, 8, 12, 16, 13, 12, 8, 5, 4, 6, 0, 10, 5, 9, 11, 9, 10, 12, 18, 6, 8, 8, 12, 6, 9, 9, 4, 16, 3, 5, 4, 14, 9, 11, 11, 14, 6, 13, 10, 7, 12, 8, 2, 11, 12, 2, 4, 8, 10, 13, 12, 8, 18, 8, 3, 13, 13, 8, 9, 9, 8, 7, 9, 10, 8, 10, 14, 17, 7, 9, 6, 10, 1, 10, 9, 9, 6, 8, 7, 11, 10, 9, 10, 17, 12, 13, 15, 7, 8, 15, 12, 6, 6, 12, 8, 10, 4, 13, 8, 12, 13, 10, 9, 8, 11, 12, 7, 5, 3, 13, 8, 12, 10, 3, 9, 8, 11, 7, 7, 2, 14, 7, 2, 6, 12, 2, 12, 8, 9, 4, 9, 13, 7, 10, 11, 10, 8, 4, 5, 9, 9, 11, 5, 6, 1, 14, 11, 9, 7, 6, 11, 5, 6, 2, 3, 17, 13, 3, 5, 14, 8, 10, 8, </pre>	<pre> 5, 0, 8, 7, 9, 7, 5, 6, 9, 2, 3, 1, 8, 0, 9, 6, 0, 2, 5, 6, 1, 3, 7, 3, 4, 7, 2, 3, 0, 0, 5, ...snip... , 6, 6, 11, 13, 15, 9, 11, 4, 13, 12, 12, 9, 13, 12, 12, 9, 10, 16, 13, 8, 15, 4, 16, 4, 3, 7, 4, 8, 8, 5, 7, 7, 15, 13, 6, 6, 10, 15, 7, 8, 10, 8, 12, 8, 7, 7, 2, 10, 10, 10, 6, 12, 7, 10, 2, 1, 15, 12, 2, 15, 10, 5, 9, 5, 12, 10, 17, 9, 3, 14, 12, 2, 6, 3, 7, 12, 2, 15, 6, 13, 5, 8, 9, 10, 4, 10, 8, 14, 4, 3, 4, 12, 8, 4, 1, 8, 9, 9, 16, 13, 10, 10, 9, 16, 4, 6, 6, 0, 8, 9, 9, 12, 9, 12, 12, 15, 10, 11, 7, 10, 17, 11, 6, 13, 4, 11, 14, 6, 14, 10, 15, 6, 2, 14, 6, 3, 16, 14, 9, 5, 15, 6, 6, 10, 10, 13, 6, 11, 12, 16, 12, 11, 10, 1, 8, 12, 7, 7, 15, 7, 8, 10, 16, 12, 9, 4, 9, 16, 14, 9, 7, 10, 4, 1, 9, 10, 12, 5, 0, 11, 7, 8, 3, 6, 15, 11, 11, 9, 3, 17, 11, 3, 12, 11, 14, 9, 13, 6, 8, 16, 6, 13, 6, 12, 6, 9, 9, 6, 1, 2, 2, 12, 18, 3, 4, 0, 6, 8, 10, 8, 10, 10, 5, 4, 1, 12, 11, 11, 17, 7, 2, 8, 8, 8, 10, 6, 13, 5, 13, 7, 3, 6, 15, 13, 7, 12, 8, 17, 8, 3, 12, 8, 16, 12, 13, 6, 9, 2, 11, 5, 9, 10, 8, 15, 9, 10, 9, 7, 16, 12, 6, 6, 8, 9, 17, 5, 12, 11, 15, 11, 5, 11, 11, 11, 11, 3, 5, 8, 13, 9, 11, 11, 7, 13, 6, 8, 13, 9, 9, 14, 2, 15, 6, 6, 2, 13, 10, 13, 13, 10, 10, 10, 15, 16, 1, 5, 11, 3, 8, 4, 4, 10, 10, 1, 3, 18, 10, 6, 13, 14, 15, 8, 10, 10, 9, 10, 5, 11, 16, 7, 8, 6, 2, 9, 1, 8, 3, 7, 3, 5, 13, 11, 10, 7, 11, 5, 13, 17, 13, 15, 12, 13, 9, 1, 4, 11, 8, 12, 16, 13, 12, 8, 5, 4, 6, 0, 10, 5, 9, 11, 9, 10, 12, 18, 6, 8, 8, 12, 6, 9, 9, 4, 16, 3, 5, 4, 14, 9, 11, 11, 14, 6, 13, 10, 7, 12, 8, 2, 11, 12, 2, 4, 8, 10, 13, 12, 8, 18, 8, 3, 13, 13, 8, 9, 9, 8, 7, 9, 10, 8, 10, 14, 17, 7, 9, 6, 10, 1, 10, 9, 9, 6, 8, 7, 11, 10, 9, 10, 17, 12, 13, 15, 7, 8, 15, 12, 6, 6, 12, 8, 10, 4, 13, 8, 12, 13, 10, 9, 8, 11, 12, 7, 5, 3, 13, 8, 12, 10, 3, 9, 8, 11, 7, 7, 2, 14, 7, 2, 6, 12, 2, 12, 8, 9, 4, 9, 13, 7, 10, 11, 10, 8, 4, 5, 9, 9, 11, 5, 6, 1, 14, 11, 9, 7, 6, 11, 5, 6, 2, 3, 17, 13, 3, 5, 14, 8, 10, 8, </pre>

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LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> 9, 8, 0, 7, 3, 5, 4, 7, 8, 7, 1, 3, 9, 1, 6, 3, 0, 0, 2, 0, 6, 8, 3, 0, 1, 3, 0, 5, 8, 2, 3, ...snip... 2, 16, 6, 6, 9, 15, 13, 8, 4, 2, 15, 7, 10, 5, 11, 11, 7, 10, 8, 12, 8, 4, 4, 9, 5, 11, 16, 9, 13, 16, 4, 8, 5, 12, 11, 17, 8, 9, 10, 10, 8, 5, 5, 8, 6, 10, 5, 14, 13, 10, 7, 13, 15, 2, 5, 4, 11, 3, 10, 5, 11, 9, 1, 13, 7, 6, 12, 10, 8, 8, 12, 11, 1, 9, 6, 5, 9, 17, 12, 13, 14, 3, 3, 2, 10, 13, 9, 4, 3, 3, 0, 8, 6, 11, 6, 1, 12, 9, 14, 8, 18, 13, 13, 6, 15, 16, 11, 3, 10, 12, 11, 10, 13, 9, 7, 6, 9, 12, 16, 12, 6, 5, 9, 14, 13, 7, 2, 12, 17, 2, 18, 7, 14, 9, 5, 10, 9, 12, 16, 10, 13, 14, 3, 9, 10, 14, 4, 8, 4, 12, 11, 17, 9, 7, 2, 4, 10, 10, 4, 16, 5, 5, 11, 8, 7, 10, 4, 12, 2, 11, 2, 12, 9, 12, 9, 8, 16, 15, 2, 4, 9, 8, 17, 6, 12, 16, 13, 14, 6, 8, 12, 15, 9, 10, 11, 8, 15, 5, 11, 7, 7, 9, 16, 12, 8, 6, 14, 7, 11, 5, 18, 11, 2, 6, 13, 8, 11, 4, 7, 10, 7, 5, 3, 12, 13, 9, 14, 8, 9, 5, 10, 12, 1, 0, 12, 17, 13, 15, 7, 9, 13, 12, 10, 16, 3, 10, 8, 11, 10, 2, 11, 10, 14, 10, 12, 4, 7, 5, 3, 4, 9, 6, 9, 10, 4, 1, 15, 9, 9, 13, 18, 12, 4, 5, 2, 8, 5, 16, 7, 6, 11, 6, 9, 5, 9, 12, 15, 15, 6, 9, 6, 12, 9, 5, 2, 15, 12, 14, 7, 10, 16, 11, 6, 9, 15, 17, 8, 13, 8, 7, 3, 4, 15, 14, 13, 6, 6, 11, 15, 10, 13, 1, 12, 10, 6, 11, 7, 10, 7, 8, 14, 9, 9, 18, 7, 14, 14, 10, 12, 12, 6, 3, 8, 15, 2, 6, 7, 2, 12, 10, 2, 13, 9, 6, 11, 8, 0, 12, 9, 16, 6, 9, 9, 10, 15, 7, 8, 15, 8, 6, 11, 2, 1, 7, 0, 8, 4, 4, 17, 18, 8, 3, 4, 12, 4, 18, 13, 13, 8, 8, 10, 1, 5, 5, 15, 18, 2, 11, 10, 5, 9, 7, 7, 4, 15, 3, 7, 8, 13, 9, 10, 8, 9, 9, 7, 17, 7, 10, 10, 6, 8, 12, 14, 15, 1, 4, 1, 12, 12, 10, 16, 5, 4, 7, 8, 13, 9, 10, 17, 8, 7, 15, 7, 8, 7, 14, 16, 3, 12, 7, 3, 10, 13, 2, 12, 12, 11, 5, 4, 9, 13, 1, 9, 3, 17, 12, 2, 15, 16, 14, 13, 11, 11, 6, 3, 6, 11, 13, 12, 10, 9, 14, 13, 7, 10, 11, 14, 9, 11, 2, 11, 7, 14, 10, 16, 14, 15, 5, 4, 5, 14, 8, 10, 10, 12, 13, 8, 9, 11, 9, 10, 3, 9, 6, 13, 16, 12, 7, 7, 9, 12, 4, 11, 15, 13, 11, 12, 8, 6, 14, </pre>	<pre> 9, 8, 0, 7, 3, 5, 4, 7, 8, 7, 1, 3, 9, 1, 6, 3, 0, 0, 2, 0, 6, 8, 3, 0, 1, 3, 0, 5, 8, 2, 3, ...snip... 2, 16, 6, 6, 9, 15, 13, 8, 4, 2, 15, 7, 10, 5, 11, 11, 7, 10, 8, 12, 8, 4, 4, 9, 5, 11, 16, 9, 13, 16, 4, 8, 5, 12, 11, 17, 8, 9, 10, 10, 8, 5, 5, 8, 6, 10, 5, 14, 13, 10, 7, 13, 15, 2, 5, 4, 11, 3, 10, 5, 11, 9, 1, 13, 7, 6, 12, 10, 8, 8, 12, 11, 1, 9, 6, 5, 9, 17, 12, 13, 14, 3, 3, 2, 10, 13, 9, 4, 3, 3, 0, 8, 6, 11, 6, 1, 12, 9, 14, 8, 18, 13, 13, 6, 15, 16, 11, 3, 10, 12, 11, 10, 13, 9, 7, 6, 9, 12, 16, 12, 6, 5, 9, 14, 13, 7, 2, 12, 17, 2, 18, 7, 14, 9, 5, 10, 9, 12, 16, 10, 13, 14, 3, 9, 10, 14, 4, 8, 4, 12, 11, 17, 9, 7, 2, 4, 10, 10, 4, 16, 5, 5, 11, 8, 7, 10, 4, 12, 2, 11, 2, 12, 9, 12, 9, 8, 16, 15, 2, 4, 9, 8, 17, 6, 12, 16, 13, 14, 6, 8, 12, 15, 9, 10, 11, 8, 15, 5, 11, 7, 7, 9, 16, 12, 8, 6, 14, 7, 11, 5, 18, 11, 2, 6, 13, 8, 11, 4, 7, 10, 7, 5, 3, 12, 13, 9, 14, 8, 9, 5, 10, 12, 1, 0, 12, 17, 13, 15, 7, 9, 13, 12, 10, 16, 3, 10, 8, 11, 10, 2, 11, 10, 14, 10, 12, 4, 7, 5, 3, 4, 9, 6, 9, 10, 4, 1, 15, 9, 9, 13, 18, 12, 4, 5, 2, 8, 5, 16, 7, 6, 11, 6, 9, 5, 9, 12, 15, 15, 6, 9, 6, 12, 9, 5, 2, 15, 12, 14, 7, 10, 16, 11, 6, 9, 15, 17, 8, 13, 8, 7, 3, 4, 15, 14, 13, 6, 6, 11, 15, 10, 13, 1, 12, 10, 6, 11, 7, 10, 7, 8, 14, 9, 9, 18, 7, 14, 14, 10, 12, 12, 6, 3, 8, 15, 2, 6, 7, 2, 12, 10, 2, 13, 9, 6, 11, 8, 0, 12, 9, 16, 6, 9, 9, 10, 15, 7, 8, 15, 8, 6, 11, 2, 1, 7, 0, 8, 4, 4, 17, 18, 8, 3, 4, 12, 4, 18, 13, 13, 8, 8, 10, 1, 5, 5, 15, 18, 2, 11, 10, 5, 9, 7, 7, 4, 15, 3, 7, 8, 13, 9, 10, 8, 9, 9, 7, 17, 7, 10, 10, 6, 8, 12, 14, 15, 1, 4, 1, 12, 12, 10, 16, 5, 4, 7, 8, 13, 9, 10, 17, 8, 7, 15, 7, 8, 7, 14, 16, 3, 12, 7, 3, 10, 13, 2, 12, 12, 11, 5, 4, 9, 13, 1, 9, 3, 17, 12, 2, 15, 16, 14, 13, 11, 11, 6, 3, 6, 11, 13, 12, 10, 9, 14, 13, 7, 10, 11, 14, 9, 11, 2, 11, 7, 14, 10, 16, 14, 15, 5, 4, 5, 14, 8, 10, 10, 12, 13, 8, 9, 11, 9, 10, 3, 9, 6, 13, 16, 12, 7, 7, 9, 12, 4, 11, 15, 13, 11, 12, 8, 6, 14, </pre>

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LLNode* head = LLNode::createWithIterators(arr, arr + sizeof(arr) / sizeof(int)); LLNode::printList(head); cout << "\n"; LLNode* newhead = foldLinkedList(head); LLNode::printList(newhead); </pre>	<pre> 1, 3, 2, 4, 5, 3, 2, 2, 5, 7, 1, 7, 0, 2, 0, 0, 7, 7, 6, 2, 6, 7, 9, 1, 7, 1, 7, 6, 8, 2, 3, ...snip... , 9, 9, 9, 8, 9, 13, 10, 15, 16, 9, 12, 5, 3, 8, 13, 6, 10, 4, 8, 8, 3, 8, 3, 4, 3, 7, 11, 16, 8, 3, 6, 14, 8, 7, 4, 16, 7, 11, 4, 12, 4, 8, 17, 7, 10, 10, 10, 12, 15, 1, 6, 7, 2, 11, 15, 2, 9, 11, 3, 7, 14, 15, 13, 9, 14, 16, 4, 18, 6, 17, 7, 5, 13, 4, 7, 5, 7, 4, 5, 7, 8, 4, 11, 6, 7, 2, 14, 7, 10, 12, 15, 6, 5, 11, 8, 14, 6, 8, 8, 7, 1, 10, 3, 11, 6, 10, 8, 15, 4, 8, 11, 7, 5, 10, 5, 11, 6, 3, 5, 4, 3, 2, 8, 5, 16, 12, 4, 7, 13, 3, 8, 8, 13, 13, 6, 10, 4, 7, 13, 4, 10, 13, 2, 5, 6, 13, 16, 4, 8, 7, 12, 6, 17, 11, 13, 10, 13, 7, 13, 5, 11, 14, 10, 7, 7, 4, 14, 10, 10, 2, 9, 11, 13, 10, 9, 9, 7, 8, 8, 14, 4, 8, 5, 3, 5, 2, 9, 8, 12, 4, 13, 5, 6, 16, 6, 16, 8, 15, 5, 4, 7, 5, 12, 3, 8, 12, 6, 13, 11, 10, 13, 4, 3, 11, 8, 3, 9, 11, 9, 10, 2, 6, 15, 14, 1, 12, 3, 6, 9, 5, 12, 11, 14, 9, 6, 7, 14, 11, 8, 1, 1, 12, 5, 8, 12, 9, 4, 16, 2, 3, 10, 8, 4, 4, 9, 6, 1, 8, 2, 9, 10, 0, 18, 17, 5, 10, 12, 13, 8, 7, 4, 10, 1, 8, 8, 7, 7, 7, 8, 5, 11, 12, 7, 4, 10, 6, 16, 9, 10, 4, 9, 18, 9, 7, 4, 6, 6, 12, 11, 13, 13, 10, 4, 10, 3, 11, 10, 8, 11, 5, 8, 13, 6, 10, 15, 8, 18, 15, 15, 13, 10, 5, 9, 10, 3, 15, 7, 10, 2, 6, 9, 6, 12, 8, 4, 9, 14, 11, 9, 8, 12, 6, 1, 4, 11, 11, 6, 9, 8, 9, 6, 5, 14, 8, 9, 10, 3, 12, 10, 16, 6, 8, 16, 11, 7, 3, 11, 10, 14, 7, 2, 10, 13, 9, 10, 12, 7, 7, 15, 13, 4, 7, 2, 8, 7, 9, 14, 5, 11, 1, 8, 15, 8, 13, 3, 8, 9, 4, 9, 2, 10, 8, 9, 9, 14, 10, 12, 8, 15, 14, 4, 6, 13, 12, 0, 12, 9, 14, 9, 11, 10, 9, 9, 10, 9, 5, 11, 9, 10, 11, 9, 13, 3, 5, 8, 16, 10, 12, 9, 8, 7, 11, 6, 1, 4, 8, 5, 12, 14, 4, 12, 6, 10, 6, 13, 11, 2, 7, 13, 5, 5, 6, 7, 13, 14, 13, 12, 5, 6, 9, 12, 9, 9, 10, 15, 3, 8, 17, 3, 9, 13, 10, 8, 13, 10, 3, 8, 1, 4, 9, 8, 9, 8, 16, 9, 7, 16, 15, 8, 10, 9, 9, 16, 5, 8, 6, 3, 6, 4, 9, 13, 7, 7, 8, 13, 13, 8, 9, 7, 11, 12, 12, 11, 4, 9, 6, 7, 14, 6, 7, 1, 11, 1, 7, 8, 16, 13, 16, 13, 5, 3, </pre>	<pre> 1, 3, 2, 4, 5, 3, 2, 2, 5, 7, 1, 7, 0, 2, 0, 0, 7, 7, 6, 2, 6, 7, 9, 1, 7, 1, 7, 6, 8, 2, 3, ...snip... , 9, 9, 9, 8, 9, 13, 10, 15, 16, 9, 12, 5, 3, 8, 13, 6, 10, 4, 8, 8, 3, 8, 3, 4, 3, 7, 11, 16, 8, 3, 6, 14, 8, 7, 4, 16, 7, 11, 4, 12, 4, 8, 17, 7, 10, 10, 10, 12, 15, 1, 6, 7, 2, 11, 15, 2, 9, 11, 3, 7, 14, 15, 13, 9, 14, 16, 4, 18, 6, 17, 7, 5, 13, 4, 7, 5, 7, 4, 5, 7, 8, 4, 11, 6, 7, 2, 14, 7, 10, 12, 15, 6, 5, 11, 8, 14, 6, 8, 8, 7, 1, 10, 3, 11, 6, 10, 8, 15, 4, 8, 11, 7, 5, 10, 5, 11, 6, 3, 5, 4, 3, 2, 8, 5, 16, 12, 4, 7, 13, 3, 8, 8, 13, 13, 6, 10, 4, 7, 13, 4, 10, 13, 2, 5, 6, 13, 16, 4, 8, 7, 12, 6, 17, 11, 13, 10, 13, 7, 13, 5, 11, 14, 10, 7, 7, 4, 14, 10, 10, 2, 9, 11, 13, 10, 9, 9, 7, 8, 8, 14, 4, 8, 5, 3, 5, 2, 9, 8, 12, 4, 13, 5, 6, 16, 6, 16, 8, 15, 5, 4, 7, 5, 12, 3, 8, 12, 6, 13, 11, 10, 13, 4, 3, 11, 8, 3, 9, 11, 9, 10, 2, 6, 15, 14, 1, 12, 3, 6, 9, 5, 12, 11, 14, 9, 6, 7, 14, 11, 8, 1, 1, 12, 5, 8, 12, 9, 4, 16, 2, 3, 10, 8, 4, 4, 9, 6, 1, 8, 2, 9, 10, 0, 18, 17, 5, 10, 12, 13, 8, 7, 4, 10, 1, 8, 8, 7, 7, 7, 8, 5, 11, 12, 7, 4, 10, 6, 16, 9, 10, 4, 9, 18, 9, 7, 4, 6, 6, 12, 11, 13, 13, 10, 4, 10, 3, 11, 10, 8, 11, 5, 8, 13, 6, 10, 15, 8, 18, 15, 15, 13, 10, 5, 9, 10, 3, 15, 7, 10, 2, 6, 9, 6, 12, 8, 4, 9, 14, 11, 9, 8, 12, 6, 1, 4, 11, 11, 6, 9, 8, 9, 6, 5, 14, 8, 9, 10, 3, 12, 10, 16, 6, 8, 16, 11, 7, 3, 11, 10, 14, 7, 2, 10, 13, 9, 10, 12, 7, 7, 15, 13, 4, 7, 2, 8, 7, 9, 14, 5, 11, 1, 8, 15, 8, 13, 3, 8, 9, 4, 9, 2, 10, 8, 9, 9, 14, 10, 12, 8, 15, 14, 4, 6, 13, 12, 0, 12, 9, 14, 9, 11, 10, 9, 9, 10, 9, 5, 11, 9, 10, 11, 9, 13, 3, 5, 8, 16, 10, 12, 9, 8, 7, 11, 6, 1, 4, 8, 5, 12, 14, 4, 12, 6, 10, 6, 13, 11, 2, 7, 13, 5, 5, 6, 7, 13, 14, 13, 12, 5, 6, 9, 12, 9, 9, 10, 15, 3, 8, 17, 3, 9, 13, 10, 8, 13, 10, 3, 8, 1, 4, 9, 8, 9, 8, 16, 9, 7, 16, 15, 8, 10, 9, 9, 16, 5, 8, 6, 3, 6, 4, 9, 13, 7, 7, 8, 13, 13, 8, 9, 7, 11, 12, 12, 11, 4, 9, 6, 7, 14, 6, 7, 1, 11, 1, 7, 8, 16, 13, 16, 13, 5, 3, </pre>

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